

SEQUENCE LISTING

<110> KYOWA HAKKO KOGYO CO., LTD.,

<120> NOVEL POLYPEPTIDE

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<150> H10-332484

<151> 1998-11-24

<150> H11-248442

<151> 1999-09-02

<160> 18

<170> PatentIn Ver. 2.0

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Met Met Glu

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Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln Asp Asp Tyr

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Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu Ala Gly Ser

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atc tac cgc gag ttc gag cgc ctc att cac tgc tat gac gag gag gtg 259

Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp Glu Glu Val

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gtc aag gag ctc atg ccg ctg gtg gtg aac gtg ctg gag aac ctt gac 307

Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu Asn Leu Asp

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tcg gtg ctg agc gag aac cag gag cac gag gtg gag ctg gag ctc cta 355

Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu Glu Leu Leu

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cgc gag gac aac gag cag ctg ctc acg caa tac gag cgc gag aag gcg 403  
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 Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu Asp Ala Leu  
 100 105 110 115

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 Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His Tyr Glu Phe  
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cag aca cgc cag ctg gag cta aag gcc aaa aac tat gca gat cag att 547  
 Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala Asp Gln Ile  
 135 140 145

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 Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu Tyr Asn Ala  
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ctg cac cag cgg cac aca gag atg atc cag acc tat gtg gaa cac att 643  
 Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val Glu His Ile  
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gaa aga tcc aag atg cag caa gtt ggg ggt agc ggc caa aca gaa agc 691  
 Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln Thr Glu Ser  
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 Ser Leu Pro Gly Arg Arg Lys Glu Arg Pro Thr Ser Leu Asn Val Phe  
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ccc ctg gct gat ggc atg tgt cca aac gat gag atg tct gag tca ggc 787  
 Pro Leu Ala Asp Gly Met Cys Pro Asn Asp Glu Met Ser Glu Ser Gly  
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cag tcc tca gca gct gca aca ccc agt acc aca ggt acc aag tcc aac 835  
 Gln Ser Ser Ala Ala Ala Thr Pro Ser Thr Thr Gly Thr Lys Ser Asn  
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 Thr Pro Thr Ser Ser Val Pro Ser Ala Ala Val Thr Pro Leu Asn Glu  
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 Ser Leu Gln Pro Leu Gly Asp Tyr Val Ser Val Thr Lys Asn Asn Lys  
 260 265 270 275

cag gcc cga gag aag cgc aat agc cgt aac atg gag gtc cag gtc acc 979  
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|---|-----|-----|------|
| 280   | 285 | 290 |      |
| caa gag atg cgg aac gtc agt atc ggc atg ggc agc agt gac gag tgg |     |     | 1027 |
| Gln Glu Met Arg Asn Val Ser Ile Gly Met Gly Ser Ser Asp Glu Trp |     |     |      |
| 295   | 300 | 305 |      |
| tcc gat gtt cag gac att atc gac tcc acc cca gag ctg gat gtg tgt |     |     | 1075 |
| Ser Asp Val Gln Asp Ile Ile Asp Ser Thr Pro Glu Leu Asp Val Cys |     |     |      |
| 310   | 315 | 320 |      |
| cct gaa acc cgt ctg gag cgc aca gga agc agc cca acc cag gga att |     |     | 1123 |
| Pro Glu Thr Arg Leu Glu Arg Thr Gly Ser Ser Pro Thr Gln Gly Ile |     |     |      |
| 325   | 330 | 335 |      |
| gta aac aaa gct ttt gga atc aac act gac tcc ttg tat cac gaa ctc |     |     | 1171 |
| Val Asn Lys Ala Phe Gly Ile Asn Thr Asp Ser Leu Tyr His Glu Leu |     |     |      |
| 340   | 345 | 350 | 355  |
| tcc acg gcg gga tct gag gtc atc ggg gat gtg gac gag gga gct gat |     |     | 1219 |
| Ser Thr Ala Gly Ser Glu Val Ile Gly Asp Val Asp Glu Gly Ala Asp |     |     |      |
| 360   | 365 | 370 |      |
| ctc cta ggg gag ttt tca gtg cgc gat gat ttt ttt gga atg ggc aaa |     |     | 1267 |
| Leu Leu Gly Glu Phe Ser Val Arg Asp Asp Phe Phe Gly Met Gly Lys |     |     |      |
| 375   | 380 | 385 |      |

|  |      |
|--|------|
| gaa gtg ggg aac ctg ctg ctg gag aac tca cag ctt cta gag aca aaa  | 1315 |
| Glu Val Gly Asn Leu Leu Leu Glu Asn Ser Gln Leu Leu Glu Thr Lys  |      |
| 390 395 400  |      |
| aat gct tta aat gta gtg aag aat gac ctc att gct aag gtt gac caa  | 1363 |
| Asn Ala Leu Asn Val Val Lys Asn Asp Leu Ile Ala Lys Val Asp Gln  |      |
| 405 410 415  |      |
| ctg tca gga gaa cag gag gtc ctg aag ggt gag ctg gaa gca gcc aag  | 1411 |
| Leu Ser Gly Glu Gln Glu Val Leu Lys Gly Glu Leu Glu Ala Ala Lys  |      |
| 420 425 430 435  |      |
| caa gcg aaa gtc aag ctg gag aac cga atc aaa gag ctt gaa gaa gaa  | 1459 |
| Gln Ala Lys Val Lys Leu Glu Asn Arg Ile Lys Glu Leu Glu Glu Glu  |      |
| 440 445 450  |      |
| ctg aag aga gtc aag tca gag gca gta act gcc cgc cgt gag ccc aga  | 1507 |
| Leu Lys Arg Val Lys Ser Glu Ala Val Thr Ala Arg Arg Glu Pro Arg  |      |
| 455 460 465  |      |
| gaa gag. gtg gag gat gta agc agc tat ctc tgt aca gaa ttg gac aaa | 1555 |
| Glu Glu Val Glu Asp Val Ser Ser Tyr Leu Cys Thr Glu Leu Asp Lys  |      |
| 470 475 480  |      |
| atc ccc atg gcc cag cgc cga cgc ttc aca cgg gtg gag atg gcc cga  | 1603 |
| Ile Pro Met Ala Gln Arg Arg Arg Phe Thr Arg Val Glu Met Ala Arg  |      |

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 Val Leu Met Glu Arg Asn Gln Tyr Lys Glu Arg Leu Met Glu Leu Gln  
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gag gct gtg agg tgg act gaa atg atc aga gca tca agg gaa cac cca 1699  
 Glu Ala Val Arg Trp Thr Glu Met Ile Arg Ala Ser Arg Glu His Pro  
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tct gtc cag gag aag aag aag tcc acc atc tgg cag ttc ttt agt cgc 1747  
 Ser Val Gln Glu Lys Lys Lys Ser Thr Ile Trp Gln Phe Phe Ser Arg  
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ctc ttc agc tcc tca tct agc ccc cct ccg gcc aaa cga tcc tac cca 1795  
 Leu Phe Ser Ser Ser Ser Ser Pro Pro Pro Ala Lys Arg Ser Tyr Pro  
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tct gtg aac att cac tac aag tca ccc act gca gct ggc ttt agc cag 1843  
 Ser Val Asn Ile His Tyr Lys Ser Pro Thr Ala Ala Gly Phe Ser Gln  
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cgt cgc agc cat gct ttg tgc cag atc tca gcc ggc agc agg ccc ctg 1891  
 Arg Arg Ser His Ala Leu Cys Gln Ile Ser Ala Gly Ser Arg Pro Leu  
 580 585 590 595

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| gag ttc ttc cct gat gat gac tgc acc tct tct gcc cgg cgg gag cag | 1939 |
| Glu Phe Phe Pro Asp Asp Asp Cys Thr Ser Ser Ala Arg Arg Glu Gln |      |
| 600 605 610   |      |
| aag cgg gag cag tac cgc cag gtt cgt gaa cac gtg cgc aat gat gac | 1987 |
| Lys Arg Glu Gln Tyr Arg Gln Val Arg Glu His Val Arg Asn Asp Asp |      |
| 615 620 625   |      |
| ggg agg ctg cag gcc tgt ggg tgg agc ctg cct gcc aag tac aag cag | 2035 |
| Gly Arg Leu Gln Ala Cys Gly Trp Ser Leu Pro Ala Lys Tyr Lys Gln |      |
| 630 635 640   |      |
| ctg agc ccc aat gga ggc cag gaa gac acc cgg atg aaa aat gtg cct | 2083 |
| Leu Ser Pro Asn Gly Gly Gln Glu Asp Thr Arg Met Lys Asn Val Pro |      |
| 645 650 655   |      |
| gtc cct gtg tac tgt cgc cct ctg gtg gag aag gac cct tcg aca aag | 2131 |
| Val Pro Val Tyr Cys Arg Pro Leu Val Glu Lys Asp Pro Ser Thr Lys |      |
| 660 665 670 675   |      |
| ctg tgg tgt gct gct ggt gtc aac ctg agt ggg tgg aag cca cat gaa | 2179 |
| Leu Trp Cys Ala Ala Gly Val Asn Leu Ser Gly Trp Lys Pro His Glu |      |
| 680 685 690   |      |
| gag gac tct agc aat gga ccc aag cct gta cca ggt cga gac cct ctg | 2227 |
| Glu Asp Ser Ser Asn Gly Pro Lys Pro Val Pro Gly Arg Asp Pro Leu |      |



695

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acc tgt gac cgg gaa gga gaa ggc gaa ccc aag agc aca cac cca tca 2275

Thr Cys Asp Arg Glu Gly Glu Gly Glu Pro Lys Ser Thr His Pro Ser

710

715

720

cct gag aag aag aag gca aag gaa acc cct gag gca gat gct acc tcc 2323

Pro Glu Lys Lys Lys Ala Lys Glu Thr Pro Glu Ala Asp Ala Thr Ser

725

730

735

agt cgg gta tgg atc ctc acc agc acc ctg aca acc agc aag gtg gtg 2371

Ser Arg Val Trp Ile Leu Thr Ser Thr Leu Thr Thr Ser Lys Val Val

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745

750

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atc att gat gcc aac cag cca ggc aca att gtg gat cag ttc aca gtc 2419

Ile Ile Asp Ala Asn Gln Pro Gly Thr Ile Val Asp Gln Phe Thr Val

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765

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tgc aat gcc cac gtc ctg tgt atc tcc agc att cct gcg gcc agt gac 2467

Cys Asn Ala His Val Leu Cys Ile Ser Ser Ile Pro Ala Ala Ser Asp

775

780

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agt gac tat ccc cct ggg gag atg ttc cta gac agt gat gtg aac cct 2515

Ser Asp Tyr Pro Pro Gly Glu Met Phe Leu Asp Ser Asp Val Asn Pro

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gaa gat tca ggt gct gat ggt gtg ctg gct ggc atc acc ctg gtg ggg 2563  
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815

tgt gct acc cgc tgc aat gtt cca cgt agc aac tgt tcc tca cga gga 2611  
 Cys Ala Thr Arg Cys Asn Val Pro Arg Ser Asn Cys Ser Ser Arg Gly

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835

gac acc cca gta ctg gac aag ggg cag ggg gat gtg gcg acc act gcc 2659  
 Asp Thr Pro Val Leu Asp Lys Gly Gln Gly Asp Val Ala Thr Thr Ala

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845

850

aat ggg aag gtc aac ccg tcc caa tcc aca gaa gaa gcc aca gaa gcc 2707  
 Asn Gly Lys Val Asn Pro Ser Gln Ser Thr Glu Glu Ala Thr Glu Ala

855

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aca gag gtg cca gac cct ggt ccc agc gag tca gaa gca acg aca gtc 2755  
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870

875

880

cgg ccc ggg cct ctc aca gag cat gtc ttt act gac cca gca ccc acc 2803  
 Arg Pro Gly Pro Leu Thr Glu His Val Phe Thr Asp Pro Ala Pro Thr

885

890

895

cca tcc tcc agc acc cag cct gcc agt gag aat ggg tca gaa tcc aat 2851  
 Pro Ser Ser Ser Thr Gln Pro Ala Ser Glu Asn Gly Ser Glu Ser Asn

|   |      |      |      |      |
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| 900   | 905  | 910  | 915  |      |
| ggc acc att gta cag cct cag gtg gag ccc agt ggg gaa ctc tca aca |      |      |      | 2899 |
| Gly Thr Ile Val Gln Pro Gln Val Glu Pro Ser Gly Glu Leu Ser Thr |      |      |      |      |
|   | 920  | 925  | 930  |      |
| aca acc agt agc gct gca ccc act atg tgg cta gga gcc cag aat ggc |      |      |      | 2947 |
| Thr Thr Ser Ser Ala Ala Pro Thr Met Trp Leu Gly Ala Gln Asn Gly |      |      |      |      |
|   | 935  | 940  | 945  |      |
| tgg ctc tat gtg cat tca gcg gta gcc aac tgg aag aag tgt ctg cac |      |      |      | 2995 |
| Trp Leu Tyr Val His Ser Ala Val Ala Asn Trp Lys Lys Cys Leu His |      |      |      |      |
|   | 950  | 955  | 960  |      |
| tcc atc aag cta aaa gac tct gtg ctg agc ctg gtg cat gtc aaa ggc |      |      |      | 3043 |
| Ser Ile Lys Leu Lys Asp Ser Val Leu Ser Leu Val His Val Lys Gly |      |      |      |      |
|   | 965  | 970  | 975  |      |
| cga gtg ctg gta gct ctt gca gat ggg acc ctg gct atc ttc cat cgt |      |      |      | 3091 |
| Arg Val Leu Val Ala Leu Ala Asp Gly Thr Leu Ala Ile Phe His Arg |      |      |      |      |
| 980   | 985  | 990  | 995  |      |
| gga gag gat ggc cag tgg gac ctg agc aac tac cac cta atg gac ctg |      |      |      | 3139 |
| Gly Glu Asp Gly Gln Trp Asp Leu Ser Asn Tyr His Leu Met Asp Leu |      |      |      |      |
|   | 1000 | 1005 | 1010 |      |

ggc cac cca cac cac tcc atc cgc tgc atg gct gtt gtg aat gac cga 3187  
 Gly His Pro His His Ser Ile Arg Cys Met Ala Val Val Asn Asp Arg

1015

1020

1025

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 Val Trp Cys Gly Tyr Lys Asn Lys Val His Val Ile Gln Pro Lys Thr

1030

1035

1040

atg cag att gag aaa tca ttt gat gcc cac cca agg cgg gaa agc cag 3283  
 Met Gln Ile Glu Lys Ser Phe Asp Ala His Pro Arg Arg Glu Ser Gln

1045

1050

1055

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 Val Arg Gln Leu Ala Trp Ile Gly Asp Gly Val Trp Val Ser Ile Arg

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1065

1070

1075

ttg gat tct acc ctt cgg ctc tac cat gct cac acc cac cag cac ctg 3379  
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1080

1085

1090

cag gat gtg gac att gag ccc tat gtt agc aag atg cta gga acc ggc 3427  
 Gln Asp Val Asp Ile Glu Pro Tyr Val Ser Lys Met Leu Gly Thr Gly

1095

1100

1105

aag ctg ggc ttc tcc ttc gtg cgc atc aca gcc tta ctc att gca ggc 3475  
 Lys Leu Gly Phe Ser Phe Val Arg Ile Thr Ala Leu Leu Ile Ala Gly

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| 1110  | 1115 | 1120 |      |
| aac cgt ctg tgg gtg ggc act ggc aat ggg gtt gtc atc tcc atc ccc |      |      | 3523 |
| Asn Arg Leu Trp Val Gly Thr Gly Asn Gly Val Val Ile Ser Ile Pro |      |      |      |
| 1125  | 1130 | 1135 |      |
| ttg act gag act gtg gtc ctg cat cga ggc cag ctc cta ggg ctc cga |      |      | 3571 |
| Leu Thr Glu Thr Val Val Leu His Arg Gly Gln Leu Leu Gly Leu Arg |      |      |      |
| 1140  | 1145 | 1150 | 1155 |
| gcc aac aag aca tcc cca aca tct ggg gag ggg acc cgc cca ggg ggc |      |      | 3619 |
| Ala Asn Lys Thr Ser Pro Thr Ser Gly Glu Gly Thr Arg Pro Gly Gly |      |      |      |
| 1160  | 1165 | 1170 |      |
| atc atc cat gtg tat ggg gac gac agc agt gac aag gcc gcc agt agt |      |      | 3667 |
| Ile Ile His Val Tyr Gly Asp Asp Ser Ser Asp Lys Ala Ala Ser Ser |      |      |      |
| 1175  | 1180 | 1185 |      |
| ttc atc ccc tac tgc tcc atg gca cag gct cag ctt tgc ttc cat ggg |      |      | 3715 |
| Phe Ile Pro Tyr Cys Ser Met Ala Gln Ala Gln Leu Cys Phe His Gly |      |      |      |
| 1190  | 1195 | 1200 |      |
| cac cgt gat gct gtc aaa ttc ttt gtc tct gtg cca gga aat gtg ctg |      |      | 3763 |
| His Arg Asp Ala Val Lys Phe Phe Val Ser Val Pro Gly Asn Val Leu |      |      |      |
| 1205  | 1210 | 1215 |      |

gcc act ctc aat ggc agt gtg cta gac agc cca tca gag ggc cct ggg 3811  
 Ala Thr Leu Asn Gly Ser Val Leu Asp Ser Pro Ser Glu Gly Pro Gly  
 1220 1225 1230 1235

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 1255 1260 1265

gga gag gat gat gaa act gag gaa tgt gcc ggg gac gtg aac cag aca 3955  
 Gly Glu Asp Asp Glu Thr Glu Glu Cys Ala Gly Asp Val Asn Gln Thr  
 1270 1275 1280

aag ccc tcg ttg tcc aag gct gag cgc agc cac atc atc gtg tgg cag 4003  
 Lys Pro Ser Leu Ser Lys Ala Glu Arg Ser His Ile Ile Val Trp Gln  
 1285 1290 1295

gtg tcc tac acc cct gag tgagaccctg tcctacctga tgccaactgt 4051  
 Val Ser Tyr Thr Pro Glu  
 1300 1305

acataggacc ctacctgcct gcctccccgc ctgttcctg gggcagccag gttcgtccat 4111

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Met Met Glu

1

atc cag atg gac gag gga gga ggt gtg gtg gtg tac caa gac gac tac 163

Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln Asp Asp Tyr

5

10

15

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Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu Ala Gly Ser  
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 Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp Glu Glu Val  
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gtc aag gag ctc atg ccg ctg gtg gtg aac gtg ctg gag aac ctt gac 307  
 Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu Asn Leu Asp  
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tcg gtg ctg agc gag aac cag gag cac gag gtg gag ctg gag ctc cta 355  
 Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu Glu Leu Leu  
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cgc gag gac aac gag cag ctg ctc acg caa tac gag cgc gag aag gcg 403  
 Arg Glu Asp Asn Glu Gln Leu Leu Thr Gln Tyr Glu Arg Glu Lys Ala  
 85 90 95

ctg cgc aaa cag gcc gag gag aaa ttc atc gaa ttt gaa gat gcc ttg 451  
 Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu Asp Ala Leu  
 100 105 110 115

gaa caa gag aag aaa gaa ctc cag atc cag gta gaa cat tat gag ttt 499  
 Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His Tyr Glu Phe  
 120 125 130



cag aca cgc cag ctg gag cta aag gcc aaa aac tat gca gat cag att 547  
Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala Asp Gln Ile  
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tcc cga ctg gag gaa cga gaa tcg gag atg aag aag gaa tac aat gcc 595  
Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu Tyr Asn Ala  
150 155 160

ctg cac cag cgg cac aca gag atg atc cag acc tat gtg gaa cac att 643  
Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val Glu His Ile  
165 170 175

gaa aga tcc aag atg cag caa gtt ggg ggt agc ggc caa aca gaa agc 691  
Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln Thr Glu Ser  
180 185 190 195

agc ctg ccc ggg cgg agt cct cgc cag tcg tgg agg aaa agc agg aag 739  
Ser Leu Pro Gly Arg Ser Pro Arg Gln Ser Trp Arg Lys Ser Arg Lys  
200 205 210

gag cgt ccc acc tct ctg aat gtc ttc ccc ctg gct gat ggc atg tgt 787  
Glu Arg Pro Thr Ser Leu Asn Val Phe Pro Leu Ala Asp Gly Met Cys  
215 220 225

cca aac gat gag atg tct gag tca ggc cag tcc tca gca gct gca aca 835

Pro Asn Asp Glu Met Ser Glu Ser Gly Gln Ser Ser Ala Ala Ala Thr

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235

240

ccc agt acc aca ggt acc aag tcc aac aca ccc acg tcc tcc gtg ccc 883

Pro Ser Thr Thr Gly Thr Lys Ser Asn Thr Pro Thr Ser Ser Val Pro

245

250

255

tca gca gca gtc acg cca ctc aac gag agc cta cag ccc ctg ggg gac 931

Ser Ala Ala Val Thr Pro Leu Asn Glu Ser Leu Gln Pro Leu Gly Asp

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270

275

tat gtc agt gtc aca aag aac aac aag cag gcc cga gag aag cgc aat 979

Tyr Val Ser Val Thr Lys Asn Asn Lys Gln Ala Arg Glu Lys Arg Asn

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285

290

agc cgt aac atg gag gtc cag gtc acc caa gag atg cgg aac gtc agt 1027

Ser Arg Asn Met Glu Val Gln Val Thr Gln Glu Met Arg Asn Val Ser

295

300

305

atc ggc atg ggc agc agt gac gag tgg tcc gat gtt cag gac att atc 1075

Ile Gly Met Gly Ser Ser Asp Glu Trp Ser Asp Val Gln Asp Ile Ile

310

315

320

gac tcc acc cca gag ctg gat gtg tgt cct gaa acc cgt ctg gag cgc 1123

Asp Ser Thr Pro Glu Leu Asp Val Cys Pro Glu Thr Arg Leu Glu Arg

325

330

335

aca gga agc agc cca acc cag gga att gta aac aaa gct ttt gga atc 1171  
 Thr Gly Ser Ser Pro Thr Gln Gly Ile Val Asn Lys Ala Phe Gly Ile  
 340 345 350 355

aac act gac tcc ttg tat cac gaa ctc tcc acg gcg gga tct gag gtc 1219  
 Asn Thr Asp Ser Leu Tyr His Glu Leu Ser Thr Ala Gly Ser Glu Val  
 360 365 370

atc ggg gat gtg gac gag gga gct gat ctc cta ggg gag ttt tca gtg 1267  
 Ile Gly Asp Val Asp Glu Gly Ala Asp Leu Leu Gly Glu Phe Ser Val  
 375 380 385

cgc gat gat ttt ttt gga atg ggc aaa gaa gtg ggg aac ctg ctg ctg 1315  
 Arg Asp Asp Phe Phe Gly Met Gly Lys Glu Val Gly Asn Leu Leu Leu  
 390 395 400

gag aac tca cag ctt cta gag aca aaa aat gct tta aat gta gtg aag 1363  
 Glu Asn Ser Gln Leu Leu Glu Thr Lys Asn Ala Leu Asn Val Val Lys  
 405 410 415

aat gac ctc att gct aag gtt gac caa ctg tca gga gaa cag gag gtc 1411  
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 420 425 430 435

ctg aag ggt gag ctg gaa gca gcc aag caa gcg aaa gtc aag ctg gag 1459

Leu Lys Gly Glu Leu Glu Ala Ala Lys Gln Ala Lys Val Lys Leu Glu

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445

450

aac cga atc aaa gag ctt gaa gaa gaa ctg aag aga gtc aag tca gag 1507

Asn Arg Ile Lys Glu Leu Glu Glu Glu Leu Lys Arg Val Lys Ser Glu

455

460

465

gca gta act gcc cgc cgt gag ccc aga gaa gag gtg gag gat gta agc 1555

Ala Val Thr Ala Arg Arg Glu Pro Arg Glu Glu Val Glu Asp Val Ser

470

475

480

agc tat ctc tgt aca gaa ttg gac aaa atc ccc atg gcc cag cgc cga 1603

Ser Tyr Leu Cys Thr Glu Leu Asp Lys Ile Pro Met Ala Gln Arg Arg

485

490

495

cgc ttc aca cgg gtg gag atg gcc cga gtg ctc atg gaa cgc aac cag 1651

Arg Phe Thr Arg Val Glu Met Ala Arg Val Leu Met Glu Arg Asn Gln

500

505

510

515

tac aag gaa cgc ctc atg gag ctg cag gag gct gtg agg tgg act gaa 1699

Tyr Lys Glu Arg Leu Met Glu Leu Gln Glu Ala Val Arg Trp Thr Glu

520

525

530

atg atc aga gca tca agg gaa cac cca tct gtc cag gag aag aag aag 1747

Met Ile Arg Ala Ser Arg Glu His Pro Ser Val Gln Glu Lys Lys Lys

535

540

545

tcc acc atc tgg cag ttc ttt agt cgc ctc ttc agc tcc tca tct agc 1795  
 Ser Thr Ile Trp Gln Phe Phe Ser Arg Leu Phe Ser Ser Ser Ser Ser

550

555

560

ccc cct ccg gcc aaa cga tcc tac cca tct gtg aac att cac tac aag 1843  
 Pro Pro Pro Ala Lys Arg Ser Tyr Pro Ser Val Asn Ile His Tyr Lys

565

570

575

tca ccc act gca gct ggc ttt agc cag cgt cgc agc cat gct ttg tgc 1891  
 Ser Pro Thr Ala Ala Gly Phe Ser Gln Arg Arg Ser His Ala Leu Cys  
 580 585 590 595

cag atc tca gcc ggc agc agg ccc ctg gag ttc ttc cct gat gat gac 1939  
 Gln Ile Ser Ala Gly Ser Arg Pro Leu Glu Phe Phe Pro Asp Asp Asp

600

605

610

tgc acc tct tct gcc cgg cgg gag cag aag cgg gag cag tac cgc cag 1987  
 Cys Thr Ser Ser Ala Arg Arg Glu Gln Lys Arg Glu Gln Tyr Arg Gln

615

620

625

gtt cgt gaa cac gtg cgc aat gat gac ggg agg ctg cag gcc tgt ggg 2035  
 Val Arg Glu His Val Arg Asn Asp Asp Gly Arg Leu Gln Ala Cys Gly

630

635

640

tgg agc ctg cct gcc aag tac aag cag ctg agc ccc aat gga ggc cag 2083

Trp Ser Leu Pro Ala Lys Tyr Lys Gln Leu Ser Pro Asn Gly Gly Gln

645

650

655

gaa gac acc cgg atg aaa aat gtg cct gtc cct gtg tac tgt cgc cct 2131

Glu Asp Thr Arg Met Lys Asn Val Pro Val Pro Val Tyr Cys Arg Pro

660

665

670

675

ctg gtg gag aag gac cct tcg aca aag ctg tgg tgt gct gct ggt gtc 2179

Leu Val Glu Lys Asp Pro Ser Thr Lys Leu Trp Cys Ala Ala Gly Val

680

685

690

aac ctg agt ggg tgg aag cca cat gaa gag gac tct agc aat gga ccc 2227

Asn Leu Ser Gly Trp Lys Pro His Glu Glu Asp Ser Ser Asn Gly Pro

695

700

705

aag cct gta cca ggt cga gac cct ctg acc tgt gac cgg gaa gga gaa 2275

Lys Pro Val Pro Gly Arg Asp Pro Leu Thr Cys Asp Arg Glu Gly Glu

710

715

720

ggc gaa ccc aag agc aca cac cca tca cct gag aag aag aag gca aag 2323

Gly Glu Pro Lys Ser Thr His Pro Ser Pro Glu Lys Lys Lys Ala Lys

725

730

735

gaa acc cct gag gca gat gct acc tcc agt cgg gta tgg atc ctc acc 2371

Glu Thr Pro Glu Ala Asp Ala Thr Ser Ser Arg Val Trp Ile Leu Thr

740

745

750

755

agc acc ctg aca acc agc aag gtg gtg atc att gat gcc aac cag cca 2419  
 Ser Thr Leu Thr Thr Ser Lys Val Val Ile Ile Asp Ala Asn Gln Pro  
 760 765 770

ggc aca att gtg gat cag ttc aca gtc tgc aat gcc cac gtc ctg tgt 2467  
 Gly Thr Ile Val Asp Gln Phe Thr Val Cys Asn Ala His Val Leu Cys  
 775 780 785

atc tcc agc att cct gcg gcc agt gac agt gac tat ccc cct ggg gag 2515  
 Ile Ser Ser Ile Pro Ala Ala Ser Asp Ser Asp Tyr Pro Pro Gly Glu  
 790 795 800

atg ttc cta gac agt gat gtg aac cct gaa gat tca ggt gct gat ggt 2563  
 Met Phe Leu Asp Ser Asp Val Asn Pro Glu Asp Ser Gly Ala Asp Gly  
 805 810 815

gtg ctg gct ggc atc acc ctg gtg ggg tgt gct acc cgc tgc aat gtt 2611  
 Val Leu Ala Gly Ile Thr Leu Val Gly Cys Ala Thr Arg Cys Asn Val  
 820 825 830 835

cca cgt agc aac tgt tcc tca cga gga gac acc cca gta ctg gac aag 2659  
 Pro Arg Ser Asn Cys Ser Ser Arg Gly Asp Thr Pro Val Leu Asp Lys  
 840 845 850

ggg cag ggg gat gtg gcg acc act gcc aat ggg aag gtc aac ccg tcc 2707

|   |             |
|---|-------------|
| Gly Gln Gly Asp Val Ala Thr Thr Ala Asn Gly Lys Val Asn Pro Ser |             |
| 855   | 860 865     |
| caa tcc aca gaa gaa gcc aca gaa gcc aca gag gtg cca gac cct ggt | 2755        |
| Gln Ser Thr Glu Glu Ala Thr Glu Ala Thr Glu Val Pro Asp Pro Gly |             |
| 870   | 875 880     |
| ccc agc gag tca gaa gca acg aca gtc cgg ccc ggg cct ctc aca gag | 2803        |
| Pro Ser Glu Ser Glu Ala Thr Thr Val Arg Pro Gly Pro Leu Thr Glu |             |
| 885   | 890 895     |
| cat gtc ttt act gac cca gca ccc acc cca tcc tcc agc acc cag cct | 2851        |
| His Val Phe Thr Asp Pro Ala Pro Thr Pro Ser Ser Ser Thr Gln Pro |             |
| 900   | 905 910 915 |
| gcc agt gag aat ggg tca gaa tcc aat ggc acc att gta cag cct cag | 2899        |
| Ala Ser Glu Asn Gly Ser Glu Ser Asn Gly Thr Ile Val Gln Pro Gln |             |
| 920   | 925 930     |
| gtg gag ccc agt ggg gaa ctc tca aca aca acc agt agc gct gca ccc | 2947        |
| Val Glu Pro Ser Gly Glu Leu Ser Thr Thr Thr Ser Ser Ala Ala Pro |             |
| 935   | 940 945     |
| act atg tgg cta gga gcc cag aat ggc tgg ctc tat gtg cat tca gcg | 2995        |
| Thr Met Trp Leu Gly Ala Gln Asn Gly Trp Leu Tyr Val His Ser Ala |             |
| 950   | 955 960     |



|   |      |
|---|------|
| gta gcc aac tgg aag aag tgt ctg cac tcc atc aag cta aaa gac tct | 3043 |
| Val Ala Asn Trp Lys Lys Cys Leu His Ser Ile Lys Leu Lys Asp Ser |      |
| 965 970 975   |      |
|   |      |
| gtg ctg agc ctg gtg cat gtc aaa ggc cga gtg ctg gta gct ctt gca | 3091 |
| Val Leu Ser Leu Val His Val Lys Gly Arg Val Leu Val Ala Leu Ala |      |
| 980 985 990 995   |      |
|   |      |
| gat ggg acc ctg gct atc ttc cat cgt gga gag gat ggc cag tgg gac | 3139 |
| Asp Gly Thr Leu Ala Ile Phe His Arg Gly Glu Asp Gly Gln Trp Asp |      |
| 1000 1005 1010  |      |
|   |      |
| ctg agc aac tac cac cta atg gac ctg ggc cac cca cac cac tcc atc | 3187 |
| Leu Ser Asn Tyr His Leu Met Asp Leu Gly His Pro His His Ser Ile |      |
| 1015 1020 1025  |      |
|   |      |
| cgc tgc atg gct gtt gtg aat gac cga gtt tgg tgt ggc tac aag aac | 3235 |
| Arg Cys Met Ala Val Val Asn Asp Arg Val Trp Cys Gly Tyr Lys Asn |      |
| 1030 1035 1040  |      |
|   |      |
| aag gtg cat gtt atc cag ccc aag aca atg cag att gag aaa tca ttt | 3283 |
| Lys Val His Val Ile Gln Pro Lys Thr Met Gln Ile Glu Lys Ser Phe |      |
| 1045 1050 1055  |      |
|   |      |
| gat gcc cac cca agg cgg gaa agc cag gta cgt cag ctg gcc tgg atc | 3331 |

|   |                |
|---|----------------|
| Asp Ala His Pro Arg Arg Glu Ser Gln Val Arg Gln Leu Ala Trp Ile |                |
| 1060  | 1065 1070 1075 |
| ggt gat gga gtg tgg gtc tct att cgc ttg gat tct acc ctt cgg ctc | 3379           |
| Gly Asp Gly Val Trp Val Ser Ile Arg Leu Asp Ser Thr Leu Arg Leu |                |
| 1080  | 1085 1090      |
| tac cat gct cac acc cac cag cac ctg cag gat gtg gac att gag ccc | 3427           |
| Tyr His Ala His Thr His Gln His Leu Gln Asp Val Asp Ile Glu Pro |                |
| 1095  | 1100 1105      |
| tat gtt agc aag atg cta gga acc ggc aag ctg ggc ttc tcc ttc gtg | 3475           |
| Tyr Val Ser Lys Met Leu Gly Thr Gly Lys Leu Gly Phe Ser Phe Val |                |
| 1110  | 1115 1120      |
| cgc atc aca gcc tta ctc att gca ggc aac cgt ctg tgg gtg ggc act | 3523           |
| Arg Ile Thr Ala Leu Leu Ile Ala Gly Asn Arg Leu Trp Val Gly Thr |                |
| 1125  | 1130 1135      |
| ggc aat ggg gtt gtc atc tcc atc ccc ttg act gag act gtg gtc ctg | 3571           |
| Gly Asn Gly Val Val Ile Ser Ile Pro Leu Thr Glu Thr Val Val Leu |                |
| 1140  | 1145 1150 1155 |
| cat cga ggc cag ctc cta ggg ctc cga gcc aac aag aca tcc cca aca | 3619           |
| His Arg Gly Gln Leu Leu Gly Leu Arg Ala Asn Lys Thr Ser Pro Thr |                |
| 1160  | 1165 1170      |

tct ggg gag ggg acc cgc cca ggg ggc atc atc cat gtg tat ggg gac 3667

Ser Gly Glu Gly Thr Arg Pro Gly Gly Ile Ile His Val Tyr Gly Asp

1175

1180

1185

gac agc agt gac aag gcc gcc agt agt ttc atc ccc tac tgc tcc atg 3715

Asp Ser Ser Asp Lys Ala Ala Ser Ser Phe Ile Pro Tyr Cys Ser Met

1190

1195

1200

gca cag gct cag ctt tgc ttc cat ggg cac cgt gat gct gtc aaa ttc 3763

Ala Gln Ala Gln Leu Cys Phe His Gly His Arg Asp Ala Val Lys Phe

1205

1210

1215

ttt gtc tct gtg cca gga aat gtg ctg gcc act ctc aat ggc agt gtg 3811

Phe Val Ser Val Pro Gly Asn Val Leu Ala Thr Leu Asn Gly Ser Val

1220

1225

1230

1235

cta gac agc cca tca gag ggc cct ggg cct gct gca ccc gct gca gat 3859

Leu Asp Ser Pro Ser Glu Gly Pro Gly Pro Ala Ala Pro Ala Ala Asp

1240

1245

1250

gct gag ggc cag aag ttg aag aat gca ctg gtg ctg agt ggt ggt gaa 3907

Ala Glu Gly Gln Lys Leu Lys Asn Ala Leu Val Leu Ser Gly Gly Glu

1255

1260

1265

ggt tac att gac ttc cgt atc gga gac gga gag gat gat gaa act gag 3955

Gly Tyr Ile Asp Phe Arg Ile Gly Asp Gly Glu Asp Asp Glu Thr Glu  
1270 1275 1280

gaa tgt gcc ggg gac gtg aac cag aca aag ccc tcg ttg tcc aag gct 4003  
Glu Cys Ala Gly Asp Val Asn Gln Thr Lys Pro Ser Leu Ser Lys Ala  
1285 1290 1295

gag cgc agc cac atc atc gtg tgg cag gtg tcc tac acc cct gag 4043  
Glu Arg Ser His Ile Ile Val Trp Gln Val Ser Tyr Thr Pro Glu  
1300 1305 1310

tgagaccctg tcctacctga tgccaactgt acataggacc ctacctgcct gcctccccgc 4102

ctgttccctg gggcagccag gttcgtccat ccccttttaa cctctcaact tgcagctttt 4162

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<213> Mouse

<220>

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tcgggccccg gaacgagccg cgctggcggc ggcggcggtta gccgag atg atg gag 115

Met Met Glu

1

atc cag atg gac gag gga gga ggt gtg gtg gtg tac caa gac gac tac 163

Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln Asp Asp Tyr

5

10

15

tgc tcg ggc tcg gtc atg tcg gag cgt gtg tcg ggc ctg gcg ggc tcc 211

Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu Ala Gly Ser

20

25

30

35

atc tac cgc gag ttc gag cgc ctc att cac tgc tat gac gag gag gtg 259

Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp Glu Glu Val

40

45

50

gtc aag gag ctc atg ccg ctg gtg gtg aac gtg ctg gag aac ctt gac 307

Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu Asn Leu Asp

55

60

65

tcg gtg ctg agc gag aac cag gag cac gag gtg gag ctg gag ctc cta 355

Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu Glu Leu Leu

70

75

80

cgc gag gac aac gag cag ctg ctc acg caa tac gag cgc gag aag gcg 403

Arg Glu Asp Asn Glu Gln Leu Leu Thr Gln Tyr Glu Arg Glu Lys Ala

85

90

95

ctg cgc aaa cag gcc gag gag aaa ttc atc gaa ttt gaa gat gcc ttg 451

Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu Asp Ala Leu

100

105

110

115

gaa caa gag aag aaa gaa ctc cag atc cag gta gaa cat tat gag ttt 499

Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His Tyr Glu Phe

120

125

130

cag aca cgc cag ctg gag cta aag gcc aaa aac tat gca gat cag att 547

Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala Asp Gln Ile

135

140

145

tcc cga ctg gag gaa cga gaa tcg gag atg aag aag gaa tac aat gcc 595

Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu Tyr Asn Ala

150

155

160

ctg cac cag cgg cac aca gag atg atc cag acc tat gtg gaa cac att 643

Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val Glu His Ile

165

170

175

gaa aga tcc aag atg cag caa gtt ggg ggt agc ggc caa aca gaa agc 691  
 Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln Thr Glu Ser  
 180 185 190 195

agc ctg ccc ggg cgg agc agg aag gag cgt ccc acc tct ctg aat gtc 739  
 Ser Leu Pro Gly Arg Ser Arg Lys Glu Arg Pro Thr Ser Leu Asn Val  
 200 205 210

ttc ccc ctg gct gat ggc atg gta cgt gca cag atg ggg ggc aag ctc 787  
 Phe Pro Leu Ala Asp Gly Met Val Arg Ala Gln Met Gly Gly Lys Leu  
 215 220 225

gtg cct gcg ggg gac cac tgg cac ctg agt gac ctc ggc cag cta cag 835  
 Val Pro Ala Gly Asp His Trp His Leu Ser Asp Leu Gly Gln Leu Gln  
 230 235 240

tcc agc tcc agc tac cag tgt cca aac gat gag atg tct gag tca ggc 883  
 Ser Ser Ser Ser Tyr Gln Cys Pro Asn Asp Glu Met Ser Glu Ser Gly  
 245 250 255

cag tcc tca gca gct gca aca ccc agt acc aca ggt acc aag tcc aac 931  
 Gln Ser Ser Ala Ala Ala Thr Pro Ser Thr Thr Gly Thr Lys Ser Asn  
 260 265 270 275

aca ccc acg tcc tcc gtg ccc tca gca gca gtc acg cca ctc aac gag 979  
 Thr Pro Thr Ser Ser Val Pro Ser Ala Ala Val Thr Pro Leu Asn Glu

|   |     |     |      |
|---|-----|-----|------|
| 280   | 285 | 290 |      |
| agc cta cag ccc ctg ggg gac tat gtc agt gtc aca aag aac aac aag |     |     | 1027 |
| Ser Leu Gln Pro Leu Gly Asp Tyr Val Ser Val Thr Lys Asn Asn Lys |     |     |      |
| 295   | 300 | 305 |      |
| cag gcc cga gag aag cgc aat agc cgt aac atg gag gtc cag gtc acc |     |     | 1075 |
| Gln Ala Arg Glu Lys Arg Asn Ser Arg Asn Met Glu Val Gln Val Thr |     |     |      |
| 310   | 315 | 320 |      |
| caa gag atg cgg aac gtc agt atc ggc atg ggc agc agt gac gag tgg |     |     | 1123 |
| Gln Glu Met Arg Asn Val Ser Ile Gly Met Gly Ser Ser Asp Glu Trp |     |     |      |
| 325   | 330 | 335 |      |
| tcc gat gtt cag gac att atc gac tcc acc cca gag ctg gat gtg tgt |     |     | 1171 |
| Ser Asp Val Gln Asp Ile Ile Asp Ser Thr Pro Glu Leu Asp Val Cys |     |     |      |
| 340   | 345 | 350 | 355  |
| cct gaa acc cgt ctg gag cgc aca gga agc agc cca acc cag gga att |     |     | 1219 |
| Pro Glu Thr Arg Leu Glu Arg Thr Gly Ser Ser Pro Thr Gln Gly Ile |     |     |      |
| 360   | 365 | 370 |      |
| gta aac aaa gct ttt gga atc aac act gac tcc ttg tat cac gaa ctc |     |     | 1267 |
| Val Asn Lys Ala Phe Gly Ile Asn Thr Asp Ser Leu Tyr His Glu Leu |     |     |      |
| 375   | 380 | 385 |      |



tcc acg gcg gga tct gag gtc atc ggg gat gtg gac gag gga gct gat 1315  
 Ser Thr Ala Gly Ser Glu Val Ile Gly Asp Val Asp Glu Gly Ala Asp

390

395

400

ctc cta ggg gag ttt tca gtg cgc gat gat ttt ttt gga atg ggc aaa 1363  
 Leu Leu Gly Glu Phe Ser Val Arg Asp Asp Phe Phe Gly Met Gly Lys

405

410

415

gaa gtg ggg aac ctg ctg ctg gag aac tca cag ctt cta gag aca aaa 1411  
 Glu Val Gly Asn Leu Leu Leu Glu Asn Ser Gln Leu Leu Glu Thr Lys

420

425

430

435

aat gct tta aat gta gtg aag aat gac ctc att gct aag gtt gac caa 1459  
 Asn Ala Leu Asn Val Val Lys Asn Asp Leu Ile Ala Lys Val Asp Gln

440

445

450

ctg tca gga gaa cag gag gtc ctg aag ggt gag ctg gaa gca gcc aag 1507  
 Leu Ser Gly Glu Gln Glu Val Leu Lys Gly Glu Leu Glu Ala Ala Lys

455

460

465

caa gcg aaa gtc aag ctg gag aac cga atc aaa gag ctt gaa gaa gaa 1555  
 Gln Ala Lys Val Lys Leu Glu Asn Arg Ile Lys Glu Leu Glu Glu Glu

470

475

480

ctg aag aga gtc aag tca gag gca gta act gcc cgc cgt gag ccc aga 1603  
 Leu Lys Arg Val Lys Ser Glu Ala Val Thr Ala Arg Arg Glu Pro Arg

|   |     |     |      |
|---|-----|-----|------|
| 485   | 490 | 495 |      |
| gaa gag gtg gag gat gta agc agc tat ctc tgt aca gaa ttg gac aaa |     |     | 1651 |
| Glu Glu Val Glu Asp Val Ser Ser Tyr Leu Cys Thr Glu Leu Asp Lys |     |     |      |
| 500   | 505 | 510 | 515  |
| atc ccc atg gcc cag cgc cga cgc ttc aca cgg gtg gag atg gcc cga |     |     | 1699 |
| Ile Pro Met Ala Gln Arg Arg Arg Phe Thr Arg Val Glu Met Ala Arg |     |     |      |
|   | 520 | 525 | 530  |
| gtg ctc atg gaa cgc aac cag tac aag gaa cgc ctc atg gag ctg cag |     |     | 1747 |
| Val Leu Met Glu Arg Asn Gln Tyr Lys Glu Arg Leu Met Glu Leu Gln |     |     |      |
|   | 535 | 540 | 545  |
| gag gct gtg agg tgg act gaa atg atc aga gca tca agg gaa cac cca |     |     | 1795 |
| Glu Ala Val Arg Trp Thr Glu Met Ile Arg Ala Ser Arg Glu His Pro |     |     |      |
|   | 550 | 555 | 560  |
| tct gtc cag gag aag aag aag tcc acc atc tgg cag ttc ttt agt cgc |     |     | 1843 |
| Ser Val Gln Glu Lys Lys Lys Ser Thr Ile Trp Gln Phe Phe Ser Arg |     |     |      |
|   | 565 | 570 | 575  |
| ctc ttc agc tcc tca tct agc ccc cct ccg gcc aaa cga tcc tac cca |     |     | 1891 |
| Leu Phe Ser Ser Ser Ser Ser Pro Pro Pro Ala Lys Arg Ser Tyr Pro |     |     |      |
| 580   | 585 | 590 | 595  |

tct gtg aac att cac tac aag tca ccc act gca gct ggc ttt agc cag 1939  
 Ser Val Asn Ile His Tyr Lys Ser Pro Thr Ala Ala Gly Phe Ser Gln

600 605 610

cgt cgc agc cat gct ttg tgc cag atc tca gcc ggc agc agg ccc ctg 1987  
 Arg Arg Ser His Ala Leu Cys Gln Ile Ser Ala Gly Ser Arg Pro Leu

615 620 625

gag ttc ttc cct gat gat gac tgc acc tct tct gcc cgg cgg gag cag 2035  
 Glu Phe Phe Pro Asp Asp Asp Cys Thr Ser Ser Ala Arg Arg Glu Gln

630 635 640

aag cgg gag cag tac cgc cag gtt cgt gaa cac gtg cgc aat gat gac 2083  
 Lys Arg Glu Gln Tyr Arg Gln Val Arg Glu His Val Arg Asn Asp Asp

645 650 655

ggg agg ctg cag gcc tgt ggg tgg agc ctg cct gcc aag tac aag cag 2131  
 Gly Arg Leu Gln Ala Cys Gly Trp Ser Leu Pro Ala Lys Tyr Lys Gln

660 665 670 675

ctg agc ccc aat gga ggc cag gaa gac acc cgg atg aaa aat gtg cct 2179  
 Leu Ser Pro Asn Gly Gly Gln Glu Asp Thr Arg Met Lys Asn Val Pro

680 685 690

gtc cct gtg tac tgt cgc cct ctg gtg gag aag gac cct tcg aca aag 2227  
 Val Pro Val Tyr Cys Arg Pro Leu Val Glu Lys Asp Pro Ser Thr Lys

|   |     |     |      |
|---|-----|-----|------|
| 695   | 700 | 705 |      |
| ctg tgg tgt gct gct ggt gtc aac ctg agt ggg tgg aag cca cat gaa |     |     | 2275 |
| Leu Trp Cys Ala Ala Gly Val Asn Leu Ser Gly Trp Lys Pro His Glu |     |     |      |
| 710   | 715 | 720 |      |
| gag gac tct agc aat gga ccc aag cct gta cca ggt cga gac cct ctg |     |     | 2323 |
| Glu Asp Ser Ser Asn Gly Pro Lys Pro Val Pro Gly Arg Asp Pro Leu |     |     |      |
| 725   | 730 | 735 |      |
| acc tgt gac cgg gaa gga gaa ggc gaa ccc aag agc aca cac cca tca |     |     | 2371 |
| Thr Cys Asp Arg Glu Gly Glu Gly Glu Pro Lys Ser Thr His Pro Ser |     |     |      |
| 740   | 745 | 750 | 755  |
| cct gag aag aag aag gca aag gaa acc cct gag gca gat gct acc tcc |     |     | 2419 |
| Pro Glu Lys Lys Lys Ala Lys Glu Thr Pro Glu Ala Asp Ala Thr Ser |     |     |      |
| 760   | 765 | 770 |      |
| agt cgg gta tgg atc ctc acc agc acc ctg aca acc agc aag gtg gtg |     |     | 2467 |
| Ser Arg Val Trp Ile Leu Thr Ser Thr Leu Thr Thr Ser Lys Val Val |     |     |      |
| 775   | 780 | 785 |      |
| atc att gat gcc aac cag cca ggc aca att gtg gat cag ttc aca gtc |     |     | 2515 |
| Ile Ile Asp Ala Asn Gln Pro Gly Thr Ile Val Asp Gln Phe Thr Val |     |     |      |
| 790   | 795 | 800 |      |

|  |      |
|--|------|
| tgc aat gcc cac gtc ctg tgt atc tcc agc att cct gcg gcc agt gac                | 2563 |
| Cys Asn Ala His Val Leu Cys Ile Ser Ser Ile Pro Ala Ala Ser Asp                |      |
| 805                      810                      815                          |      |
| agt gac tat ccc cct ggg gag atg ttc cta gac agt gat gtg aac cct                | 2611 |
| Ser Asp Tyr Pro Pro Gly Glu Met Phe Leu Asp Ser Asp Val Asn Pro                |      |
| 820                      825                      830                      835 |      |
| gaa gat tca ggt gct gat ggt gtg ctg gct ggc atc acc ctg gtg ggg                | 2659 |
| Glu Asp Ser Gly Ala Asp Gly Val Leu Ala Gly Ile Thr Leu Val Gly                |      |
| 840                      845                      850                          |      |
| tgt gct acc cgc tgc aat gtt cca cgt agc aac tgt tcc tca cga gga                | 2707 |
| Cys Ala Thr Arg Cys Asn Val Pro Arg Ser Asn Cys Ser Ser Arg Gly                |      |
| 855                      860                      865                          |      |
| gac acc cca gta ctg gac aag ggg cag ggg gat gtg gcg acc act gcc                | 2755 |
| Asp Thr Pro Val Leu Asp Lys Gly Gln Gly Asp Val Ala Thr Thr Ala                |      |
| 870                      875                      880                          |      |
| aat ggg aag gtc aac ccg tcc caa tcc aca gaa gaa gcc aca gaa gcc                | 2803 |
| Asn Gly Lys Val Asn Pro Ser Gln Ser Thr Glu Glu Ala Thr Glu Ala                |      |
| 885                      890                      895                          |      |
| aca gag gtg cca gac cct ggt ccc agc gag tca gaa gca acg aca gtc                | 2851 |
| Thr Glu Val Pro Asp Pro Gly Pro Ser Glu Ser Glu Ala Thr Thr Val                |      |

|   |      |      |      |      |
|---|------|------|------|------|
| 900   | 905  | 910  | 915  |      |
| cgg ccc ggg cct ctc aca gag cat gtc ttt act gac cca gca ccc acc |      |      |      | 2899 |
| Arg Pro Gly Pro Leu Thr Glu His Val Phe Thr Asp Pro Ala Pro Thr |      |      |      |      |
|   | 920  | 925  | 930  |      |
| cca tcc tcc agc acc cag cct gcc agt gag aat ggg tca gaa tcc aat |      |      |      | 2947 |
| Pro Ser Ser Ser Thr Gln Pro Ala Ser Glu Asn Gly Ser Glu Ser Asn |      |      |      |      |
|   | 935  | 940  | 945  |      |
| ggc acc att gta cag cct cag gtg gag ccc agt ggg gaa ctc tca aca |      |      |      | 2995 |
| Gly Thr Ile Val Gln Pro Gln Val Glu Pro Ser Gly Glu Leu Ser Thr |      |      |      |      |
|   | 950  | 955  | 960  |      |
| aca acc agt agc gct gca ccc act atg tgg cta gga gcc cag aat ggc |      |      |      | 3043 |
| Thr Thr Ser Ser Ala Ala Pro Thr Met Trp Leu Gly Ala Gln Asn Gly |      |      |      |      |
|   | 965  | 970  | 975  |      |
| tgg ctc tat gtg cat tca gcg gta gcc aac tgg aag aag tgt ctg cac |      |      |      | 3091 |
| Trp Leu Tyr Val His Ser Ala Val Ala Asn Trp Lys Lys Cys Leu His |      |      |      |      |
| 980   | 985  | 990  | 995  |      |
| tcc atc aag cta aaa gac tct gtg ctg agc ctg gtg cat gtc aaa ggc |      |      |      | 3139 |
| Ser Ile Lys Leu Lys Asp Ser Val Leu Ser Leu Val His Val Lys Gly |      |      |      |      |
|   | 1000 | 1005 | 1010 |      |

cga gtg ctg gta gct ctt gca gat ggg acc ctg gct atc ttc cat cgt 3187  
 Arg Val Leu Val Ala Leu Ala Asp Gly Thr Leu Ala Ile Phe His Arg  
 1015 1020 1025

gga gag gat ggc cag tgg gac ctg agc aac tac cac cta atg gac ctg 3235  
 Gly Glu Asp Gly Gln Trp Asp Leu Ser Asn Tyr His Leu Met Asp Leu  
 1030 1035 1040

ggc cac cca cac cac tcc atc cgc tgc atg gct gtt gtg aat gac cga 3283  
 Gly His Pro His His Ser Ile Arg Cys Met Ala Val Val Asn Asp Arg  
 1045 1050 1055

gtt tgg tgt ggc tac aag aac aag gtg cat gtt atc cag ccc aag aca 3331  
 Val Trp Cys Gly Tyr Lys Asn Lys Val His Val Ile Gln Pro Lys Thr  
 1060 1065 1070 1075

atg cag att gag aaa tca ttt gat gcc cac cca agg cgg gaa agc cag 3379  
 Met Gln Ile Glu Lys Ser Phe Asp Ala His Pro Arg Arg Glu Ser Gln  
 1080 1085 1090

gta cgt cag ctg gcc tgg atc ggt gat gga gtg tgg gtc tct att cgc 3427  
 Val Arg Gln Leu Ala Trp Ile Gly Asp Gly Val Trp Val Ser Ile Arg  
 1095 1100 1105

ttg gat tct acc ctt cgg ctc tac cat gct cac acc cac cag cac ctg 3475  
 Leu Asp Ser Thr Leu Arg Leu Tyr His Ala His Thr His Gln His Leu

|   |      |      |      |
|---|------|------|------|
| 1110  | 1115 | 1120 |      |
| cag gat gtg gac att gag ccc tat gtt agc aag atg cta gga acc ggc |      |      | 3523 |
| Gln Asp Val Asp Ile Glu Pro Tyr Val Ser Lys Met Leu Gly Thr Gly |      |      |      |
| 1125  | 1130 | 1135 |      |
| aag ctg ggc ttc tcc ttc gtg cgc atc aca gcc tta ctc att gca ggc |      |      | 3571 |
| Lys Leu Gly Phe Ser Phe Val Arg Ile Thr Ala Leu Leu Ile Ala Gly |      |      |      |
| 1140  | 1145 | 1150 | 1155 |
| aac cgt ctg tgg gtg ggc act ggc aat ggg gtt gtc atc tcc atc ccc |      |      | 3619 |
| Asn Arg Leu Trp Val Gly Thr Gly Asn Gly Val Val Ile Ser Ile Pro |      |      |      |
| 1160  | 1165 | 1170 |      |
| ttg act gag act gtg gtc ctg cat cga ggc cag ctc cta ggg ctc cga |      |      | 3667 |
| Leu Thr Glu Thr Val Val Leu His Arg Gly Gln Leu Leu Gly Leu Arg |      |      |      |
| 1175  | 1180 | 1185 |      |
| gcc aac aag aca tcc cca aca tct ggg gag ggg acc cgc cca ggg ggc |      |      | 3715 |
| Ala Asn Lys Thr Ser Pro Thr Ser Gly Glu Gly Thr Arg Pro Gly Gly |      |      |      |
| 1190  | 1195 | 1200 |      |
| atc atc cat gtg tat ggg gac gac agc agt gac aag gcc gcc agt agt |      |      | 3763 |
| Ile Ile His Val Tyr Gly Asp Asp Ser Ser Asp Lys Ala Ala Ser Ser |      |      |      |
| 1205  | 1210 | 1215 |      |



|  |      |
|--|------|
| ttc atc ccc tac tgc tcc atg gca cag gct cag ctt tgc ttc cat ggg                    | 3811 |
| Phe Ile Pro Tyr Cys Ser Met Ala Gln Ala Gln Leu Cys Phe His Gly                    |      |
| 1220                      1225                      1230                      1235 |      |
| cac cgt gat gct gtc aaa ttc ttt gtc tct gtg cca gga aat gtg ctg                    | 3859 |
| His Arg Asp Ala Val Lys Phe Phe Val Ser Val Pro Gly Asn Val Leu                    |      |
| 1240                      1245                      1250                           |      |
| gcc act ctc aat ggc agt gtg cta gac agc cca tca gag ggc cct ggg                    | 3907 |
| Ala Thr Leu Asn Gly Ser Val Leu Asp Ser Pro Ser Glu Gly Pro Gly                    |      |
| 1255                      1260                      1265                           |      |
| cct gct gca ccc gct gca gat gct gag ggc cag aag ttg aag aat gca                    | 3955 |
| Pro Ala Ala Pro Ala Ala Asp Ala Glu Gly Gln Lys Leu Lys Asn Ala                    |      |
| 1270                      1275                      1280                           |      |
| ctg gtg ctg agt ggt ggt gaa ggt tac att gac ttc cgt atc gga gac                    | 4003 |
| Leu Val Leu Ser Gly Gly Glu Gly Tyr Ile Asp Phe Arg Ile Gly Asp                    |      |
| 1285                      1290                      1295                           |      |
| gga gag gat gat gaa act gag gaa tgt gcc ggg gac gtg aac cag aca                    | 4051 |
| Gly Glu Asp Asp Glu Thr Glu Glu Cys Ala Gly Asp Val Asn Gln Thr                    |      |
| 1300                      1305                      1310                      1315 |      |
| aag ccc tgc ttg tcc aag gct gag cgc agc cac atc atc gtg tgg cag                    | 4099 |
| Lys Pro Ser Leu Ser Lys Ala Glu Arg Ser His Ile Ile Val Trp Gln                    |      |

1320

1325

1330

gtg tcc tac acc cct gag tgagaccctg tcctacctga tgccaactgt 4147

Val Ser Tyr Thr Pro Glu

1335

acataggacc ctacctgcct gcctccccgc ctgttcctg ggcagccag gttcgtccat 4207

ccccitttaa cctctcaact tgcagctttt gcctgaggtc cagcccctag ctgttagaga 4267

gg

4269

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<211> 4266

<212> DNA

<213> Mouse

<220>

<221> CDS

<222> (107)..(4114)

<400> 4

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tcgggccccg gaacgagccg cgctggcggc ggcggcggtg gccgag atg atg gag 115

Met Met Glu

1

atc cag atg gac gag gga gga ggt gtg gtg gtg tac caa gac gac tac 163  
Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln Asp Asp Tyr  
5 10 15

tgc tgc ggc tgc gtc atg tgc gag cgt gtg tgc ggc ctg gcg ggc tcc 211  
Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu Ala Gly Ser  
20 25 30 35

atc tac cgc gag ttc gag cgc ctc att cac tgc tat gac gag gag gtg 259  
Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp Glu Glu Val  
40 45 50

gtc aag gag ctc atg ccg ctg gtg gtg aac gtg ctg gag aac ctt gac 307  
Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu Asn Leu Asp  
55 60 65

tgc gtg ctg agc gag aac cag gag cac gag gtg gag ctg gag ctc cta 355  
Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu Glu Leu Leu  
70 75 80

cgc gag gac aac gag cag ctg ctc acg caa tac gag cgc gag aag gcg 403  
Arg Glu Asp Asn Glu Gln Leu Leu Thr Gln Tyr Glu Arg Glu Lys Ala  
85 90 95

ctg cgc aaa cag gcc gag gag aaa ttc atc gaa ttt gaa gat gcc ttg 451  
 Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu Asp Ala Leu  
 100 105 110 115

gaa caa gag aag aaa gaa ctc cag atc cag gta gaa cat tat gag ttt 499  
 Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His Tyr Glu Phe  
 120 125 130

cag aca cgc cag ctg gag cta aag gcc aaa aac tat gca gat cag att 547  
 Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala Asp Gln Ile  
 135 140 145

tcc cga ctg gag gaa cga gaa tcg gag atg aag aag gaa tac aat gcc 595  
 Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu Tyr Asn Ala  
 150 155 160

ctg cac cag cgg cac aca gag atg atc cag acc tat gtg gaa cac att 643  
 Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val Glu His Ile  
 165 170 175

gaa aga tcc aag atg cag caa gtt ggg ggt agc ggc caa aca gaa agc 691  
 Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln Thr Glu Ser  
 180 185 190 195

agc ctg ccc ggg cgg agg aag gag cgt ccc acc tct ctg aat gtc ttc 739

Ser Leu Pro Gly Arg Arg Lys Glu Arg Pro Thr Ser Leu Asn Val Phe

200

205

210

ccc ctg gct gat ggc atg gta cgt gca cag atg ggg ggc aag ctc gtg 787

Pro Leu Ala Asp Gly Met Val Arg Ala Gln Met Gly Gly Lys Leu Val

215

220

225

cct gcg ggg gac cac tgg cac ctg agt gac ctc ggc cag cta cag tcc 835

Pro Ala Gly Asp His Trp His Leu Ser Asp Leu Gly Gln Leu Gln Ser

230

235

240

agc tcc agc tac cag tgt cca aac gat gag atg tct gag tca ggc cag 883

Ser Ser Ser Tyr Gln Cys Pro Asn Asp Glu Met Ser Glu Ser Gly Gln

245

250

255

tcc tca gca gct gca aca ccc agt acc aca ggt acc aag tcc aac aca 931

Ser Ser Ala Ala Ala Thr Pro Ser Thr Thr Gly Thr Lys Ser Asn Thr

260

265

270

275

ccc acg tcc tcc gtg ccc tca gca gca gtc acg cca ctc aac gag agc 979

Pro Thr Ser Ser Val Pro Ser Ala Ala Val Thr Pro Leu Asn Glu Ser

280

285

290

cta cag ccc ctg ggg gac tat gtc agt gtc aca aag aac aac aag cag 1027

Leu Gln Pro Leu Gly Asp Tyr Val Ser Val Thr Lys Asn Asn Lys Gln

295

300

305

gcc cga gag aag cgc aat agc cgt aac atg gag gtc cag gtc acc caa 1075  
 Ala Arg Glu Lys Arg Asn Ser Arg Asn Met Glu Val Gln Val Thr Gln  
 310 315 320

gag atg cgg aac gtc agt atc ggc atg ggc agc agt gac gag tgg tcc 1123  
 Glu Met Arg Asn Val Ser Ile Gly Met Gly Ser Ser Asp Glu Trp Ser  
 325 330 335

gat gtt cag gac att atc gac tcc acc cca gag ctg gat gtg tgt cct 1171  
 Asp Val Gln Asp Ile Ile Asp Ser Thr Pro Glu Leu Asp Val Cys Pro  
 340 345 350 355

gaa acc cgt ctg gag cgc aca gga agc agc cca acc cag gga att gta 1219  
 Glu Thr Arg Leu Glu Arg Thr Gly Ser Ser Pro Thr Gln Gly Ile Val  
 360 365 370

aac aaa gct ttt gga atc aac act gac tcc ttg tat cac gaa ctc tcc 1267  
 Asn Lys Ala Phe Gly Ile Asn Thr Asp Ser Leu Tyr His Glu Leu Ser  
 375 380 385

acg gcg gga tct gag gtc atc ggg gat gtg gac gag gga gct gat ctc 1315  
 Thr Ala Gly Ser Glu Val Ile Gly Asp Val Asp Glu Gly Ala Asp Leu  
 390 395 400

cta ggg gag ttt tca gtg cgc gat gat ttt ttt gga atg ggc aaa gaa 1363

Leu Gly Glu Phe Ser Val Arg Asp Asp Phe Phe Gly Met Gly Lys Glu

405

410

415

gtg ggg aac ctg ctg ctg gag aac tca cag ctt cta gag aca aaa aat 1411

Val Gly Asn Leu Leu Leu Glu Asn Ser Gln Leu Leu Glu Thr Lys Asn

420

425

430

435

gct tta aat gta gtg aag aat gac ctc att gct aag gtt gac caa ctg 1459

Ala Leu Asn Val Val Lys Asn Asp Leu Ile Ala Lys Val Asp Gln Leu

440

445

450

tca gga gaa cag gag gtc ctg aag ggt gag ctg gaa gca gcc aag caa 1507

Ser Gly Glu Gln Glu Val Leu Lys Gly Glu Leu Glu Ala Ala Lys Gln

455

460

465

gcg aaa gtc aag ctg gag aac cga atc aaa gag ctt gaa gaa gaa ctg 1555

Ala Lys Val Lys Leu Glu Asn Arg Ile Lys Glu Leu Glu Glu Glu Leu

470

475

480

aag aga gtc aag tca gag gca gta act gcc cgc cgt gag ccc aga gaa 1603

Lys Arg Val Lys Ser Glu Ala Val Thr Ala Arg Arg Glu Pro Arg Glu

485

490

495

gag gtg gag gat gta agc agc tat ctc tgt aca gaa ttg gac aaa atc 1651

Glu Val Glu Asp Val Ser Ser Tyr Leu Cys Thr Glu Leu Asp Lys Ile

500

505

510

515

ccc atg gcc cag cgc cga cgc ttc aca cgg gtg gag atg gcc cga gtg 1699  
 Pro Met Ala Gln Arg Arg Arg Phe Thr Arg Val Glu Met Ala Arg Val

520

525

530

ctc atg gaa cgc aac cag tac aag gaa cgc ctc atg gag ctg cag gag 1747  
 Leu Met Glu Arg Asn Gln Tyr Lys Glu Arg Leu Met Glu Leu Gln Glu

535

540

545

gct gtg agg tgg act gaa atg atc aga gca tca agg gaa cac cca tct 1795  
 Ala Val Arg Trp Thr Glu Met Ile Arg Ala Ser Arg Glu His Pro Ser

550

555

560

gtc cag gag aag aag aag tcc acc atc tgg cag ttc ttt agt cgc ctc 1843  
 Val Gln Glu Lys Lys Lys Ser Thr Ile Trp Gln Phe Phe Ser Arg Leu

565

570

575

ttc agc tcc tca tct agc ccc cct ccg gcc aaa cga tcc tac cca tct 1891  
 Phe Ser Ser Ser Ser Ser Pro Pro Pro Ala Lys Arg Ser Tyr Pro Ser

580

585

590

595

gtg aac att cac tac aag tca ccc act gca gct ggc ttt agc cag cgt 1939  
 Val Asn Ile His Tyr Lys Ser Pro Thr Ala Ala Gly Phe Ser Gln Arg

600

605

610

cgc agc cat gct ttg tgc cag atc tca gcc ggc agc agg ccc ctg gag 1987



Arg Ser His Ala Leu Cys Gln Ile Ser Ala Gly Ser Arg Pro Leu Glu  
615 620 625

ttc ttc cct gat gat gac tgc acc tct tct gcc cgg cgg gag cag aag 2035  
Phe Phe Pro Asp Asp Asp Cys Thr Ser Ser Ala Arg Arg Glu Gln Lys  
630 635 640

cgg gag cag tac cgc cag gtt cgt gaa cac gtg cgc aat gat gac ggg 2083  
Arg Glu Gln Tyr Arg Gln Val Arg Glu His Val Arg Asn Asp Asp Gly  
645 650 655

agg ctg cag gcc tgt ggg tgg agc ctg cct gcc aag tac aag cag ctg 2131  
Arg Leu Gln Ala Cys Gly Trp Ser Leu Pro Ala Lys Tyr Lys Gln Leu  
660 665 670 675

agc ccc aat gga ggc cag gaa gac acc cgg atg aaa aat gtg cct gtc 2179  
Ser Pro Asn Gly Gly Gln Glu Asp Thr Arg Met Lys Asn Val Pro Val  
680 685 690

cct gtg tac tgt cgc cct ctg gtg gag aag gac cct tcg aca aag ctg 2227  
Pro Val Tyr Cys Arg Pro Leu Val Glu Lys Asp Pro Ser Thr Lys Leu  
695 700 705

tgg tgt gct gct ggt gtc aac ctg agt ggg tgg aag cca cat gaa gag 2275  
Trp Cys Ala Ala Gly Val Asn Leu Ser Gly Trp Lys Pro His Glu Glu  
710 715 720

gac tct agc aat gga ccc aag cct gta cca ggt cga gac cct ctg acc 2323  
 Asp Ser Ser Asn Gly Pro Lys Pro Val Pro Gly Arg Asp Pro Leu Thr

725

730

735

tgt gac cgg gaa gga gaa ggc gaa ccc aag agc aca cac cca tca cct 2371  
 Cys Asp Arg Glu Gly Glu Gly Glu Pro Lys Ser Thr His Pro Ser Pro

740

745

750

755

gag aag aag aag gca aag gaa acc cct gag gca gat gct acc tcc agt 2419  
 Glu Lys Lys Lys Ala Lys Glu Thr Pro Glu Ala Asp Ala Thr Ser Ser

760

765

770

cgg gta tgg atc ctc acc agc acc ctg aca acc agc aag gtg gtg atc 2467  
 Arg Val Trp Ile Leu Thr Ser Thr Leu Thr Thr Ser Lys Val Val Ile

775

780

785

att gat gcc aac cag cca ggc aca att gtg gat cag ttc aca gtc tgc 2515  
 Ile Asp Ala Asn Gln Pro Gly Thr Ile Val Asp Gln Phe Thr Val Cys

790

795

800

aat gcc cac gtc ctg tgt atc tcc agc att cct gcg gcc agt gac agt 2563  
 Asn Ala His Val Leu Cys Ile Ser Ser Ile Pro Ala Ala Ser Asp Ser

805

810

815

gac tat ccc cct ggg gag atg ttc cta gac agt gat gtg aac cct gaa 2611

Asp Tyr Pro Pro Gly Glu Met Phe Leu Asp Ser Asp Val Asn Pro Glu  
820 825 830 835

gat tca ggt gct gat ggt gtg ctg gct ggc atc acc ctg gtg ggg tgt 2659  
Asp Ser Gly Ala Asp Gly Val Leu Ala Gly Ile Thr Leu Val Gly Cys  
840 845 850

gct acc cgc tgc aat gtt cca cgt agc aac tgt tcc tca cga gga gac 2707  
Ala Thr Arg Cys Asn Val Pro Arg Ser Asn Cys Ser Ser Arg Gly Asp  
855 860 865

acc cca gta ctg gac aag ggg cag ggg gat gtg gcg acc act gcc aat 2755  
Thr Pro Val Leu Asp Lys Gly Gln Gly Asp Val Ala Thr Thr Ala Asn  
870 875 880

ggg aag gtc aac ccg tcc caa tcc aca gaa gaa gcc aca gaa gcc aca 2803  
Gly Lys Val Asn Pro Ser Gln Ser Thr Glu Glu Ala Thr Glu Ala Thr  
885 890 895

gag gtg cca gac cct ggt ccc agc gag tca gaa gca acg aca gtc cgg 2851  
Glu Val Pro Asp Pro Gly Pro Ser Glu Ser Glu Ala Thr Thr Val Arg  
900 905 910 915

ccc ggg cct ctc aca gag cat gtc ttt act gac cca gca ccc acc cca 2899  
Pro Gly Pro Leu Thr Glu His Val Phe Thr Asp Pro Ala Pro Thr Pro  
920 925 930

tcc tcc agc acc cag cct gcc agt gag aat ggg tca gaa tcc aat ggc 2947  
 Ser Ser Ser Thr Gln Pro Ala Ser Glu Asn Gly Ser Glu Ser Asn Gly

935

940

945

acc att gta cag cct cag gtg gag ccc agt ggg gaa ctc tca aca aca 2995  
 Thr Ile Val Gln Pro Gln Val Glu Pro Ser Gly Glu Leu Ser Thr Thr

950

955

960

acc agt agc gct gca ccc act atg tgg cta gga gcc cag aat ggc tgg 3043  
 Thr Ser Ser Ala Ala Pro Thr Met Trp Leu Gly Ala Gln Asn Gly Trp

965

970

975

ctc tat gtg cat tca gcg gta gcc aac tgg aag aag tgt ctg cac tcc 3091  
 Leu Tyr Val His Ser Ala Val Ala Asn Trp Lys Lys Cys Leu His Ser  
 980 985 990 995

atc aag cta aaa gac tct gtg ctg agc ctg gtg cat gtc aaa ggc cga 3139  
 Ile Lys Leu Lys Asp Ser Val Leu Ser Leu Val His Val Lys Gly Arg

1000

1005

1010

gtg ctg gta gct ctt gca gat ggg acc ctg gct atc ttc cat cgt gga 3187  
 Val Leu Val Ala Leu Ala Asp Gly Thr Leu Ala Ile Phe His Arg Gly

1015

1020

1025

gag gat ggc cag tgg gac ctg agc aac tac cac cta atg gac ctg ggc 3235

Glu Asp Gly Gln Trp Asp Leu Ser Asn Tyr His Leu Met Asp Leu Gly

1030

1035

1040

cac cca cac cac tcc atc cgc tgc atg gct gtt gtg aat gac cga gtt 3283

His Pro His His Ser Ile Arg Cys Met Ala Val Val Asn Asp Arg Val

1045

1050

1055

tgg tgt ggc tac aag aac aag gtg cat gtt atc cag ccc aag aca atg 3331

Trp Cys Gly Tyr Lys Asn Lys Val His Val Ile Gln Pro Lys Thr Met

1060

1065

1070

1075

cag att gag aaa tca ttt gat gcc cac cca agg cgg gaa agc cag gta 3379

Gln Ile Glu Lys Ser Phe Asp Ala His Pro Arg Arg Glu Ser Gln Val

1080

1085

1090

cgt cag ctg gcc tgg atc ggt gat gga gtg tgg gtc tct att cgc ttg 3427

Arg Gln Leu Ala Trp Ile Gly Asp Gly Val Trp Val Ser Ile Arg Leu

1095

1100

1105

gat tct acc ctt cgg ctc tac cat gct cac acc cac cag cac ctg cag 3475

Asp Ser Thr Leu Arg Leu Tyr His Ala His Thr His Gln His Leu Gln

1110

1115

1120

gat gtg gac att gag ccc tat gtt agc aag atg cta gga acc ggc aag 3523

Asp Val Asp Ile Glu Pro Tyr Val Ser Lys Met Leu Gly Thr Gly Lys

1125

1130

1135

|  |      |
|--|------|
| ctg ggc ttc tcc ttc gtg cgc atc aca gcc tta ctc att gca ggc aac                    | 3571 |
| Leu Gly Phe Ser Phe Val Arg Ile Thr Ala Leu Leu Ile Ala Gly Asn                    |      |
| 1140                      1145                      1150                      1155 |      |
|  |      |
| cgt ctg tgg gtg ggc act ggc aat ggg gtt gtc atc tcc atc ccc ttg                    | 3619 |
| Arg Leu Trp Val Gly Thr Gly Asn Gly Val Val Ile Ser Ile Pro Leu                    |      |
| 1160                      1165                      1170                           |      |
|  |      |
| act gag act gtg gtc ctg cat cga ggc cag ctc cta ggg ctc cga gcc                    | 3667 |
| Thr Glu Thr Val Val Leu His Arg Gly Gln Leu Leu Gly Leu Arg Ala                    |      |
| 1175                      1180                      1185                           |      |
|  |      |
| aac aag aca tcc cca aca tct ggg gag ggg acc cgc cca ggg ggc atc                    | 3715 |
| Asn Lys Thr Ser Pro Thr Ser Gly Glu Gly Thr Arg Pro Gly Gly Ile                    |      |
| 1190                      1195                      1200                           |      |
|  |      |
| atc cat gtg tat ggg gac gac agc agt gac aag gcc gcc agt agt ttc                    | 3763 |
| Ile His Val Tyr Gly Asp Asp Ser Ser Asp Lys Ala Ala Ser Ser Phe                    |      |
| 1205                      1210                      1215                           |      |
|  |      |
| atc ccc tac tgc tcc atg gca cag gct cag ctt tgc ttc cat ggg cac                    | 3811 |
| Ile Pro Tyr Cys Ser Met Ala Gln Ala Gln Leu Cys Phe His Gly His                    |      |
| 1220                      1225                      1230                      1235 |      |
|  |      |
| cgt gat gct gtc aaa ttc ttt gtc tct gtg cca gga aat gtg ctg gcc                    | 3859 |

Arg Asp Ala Val Lys Phe Phe Val Ser Val Pro Gly Asn Val Leu Ala

1240

1245

1250

act ctc aat ggc agt gtg cta gac agc cca tca gag ggc cct ggg cct 3907

Thr Leu Asn Gly Ser Val Leu Asp Ser Pro Ser Glu Gly Pro Gly Pro

1255

1260

1265

gct gca ccc gct gca gat gct gag ggc cag aag ttg aag aat gca ctg 3955

Ala Ala Pro Ala Ala Asp Ala Glu Gly Gln Lys Leu Lys Asn Ala Leu

1270

1275

1280

gtg ctg agt ggt ggt gaa ggt tac att gac ttc cgt atc gga gac gga 4003

Val Leu Ser Gly Gly Glu Gly Tyr Ile Asp Phe Arg Ile Gly Asp Gly

1285

1290

1295

gag gat gat gaa act gag gaa tgt gcc ggg gac gtg aac cag aca aag 4051

Glu Asp Asp Glu Thr Glu Glu Cys Ala Gly Asp Val Asn Gln Thr Lys

1300

1305

1310

1315

ccc tcg ttg tcc aag gct gag cgc agc cac atc atc gtg tgg cag gtg 4099

Pro Ser Leu Ser Lys Ala Glu Arg Ser His Ile Ile Val Trp Gln Val

1320

1325

1330

tcc tac acc cct gag tgagaccctg tcctacctga tgccaactgt acataggacc 4154

Ser Tyr Thr Pro Glu

1335

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Met Ser Gly Val Arg

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Pro Pro Ile Met Asn Gly Pro Met His Pro Arg Pro Leu Val Ala Leu

10

15

20

ctg gat ggc cgg gac tgc aca gtg gag atg cct atc ctg aag gat gtg 151

Leu Asp Gly Arg Asp Cys Thr Val Glu Met Pro Ile Leu Lys Asp Val



25

30

35

gcc aca gta gcc ttc tgt gat gca cag tcc aca cag gag atc cat gag 199

Ala Thr Val Ala Phe Cys Asp Ala Gln Ser Thr Gln Glu Ile His Glu

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50

aag gta ctg aat gag gct gtg ggt gcc ctg atg tac cat acc atc aca 247

Lys Val Leu Asn Glu Ala Val Gly Ala Leu Met Tyr His Thr Ile Thr

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ctg acc aga gaa gat ctg gag aag ttt aaa gct ctt aga atc atc gtc 295

Leu Thr Arg Glu Asp Leu Glu Lys Phe Lys Ala Leu Arg Ile Ile Val

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75

80

85

cga att ggc agc ggg ttt gac aat atc gac atc aag tca gct ggg gat 343

Arg Ile Gly Ser Gly Phe Asp Asn Ile Asp Ile Lys Ser Ala Gly Asp

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cta ggc atc gca gtg tgc aat gtg ccg gca gca tct gtg gaa gaa acg 391

Leu Gly Ile Ala Val Cys Asn Val Pro Ala Ala Ser Val Glu Glu Thr

105

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gca gac tcc acc ctg tgc cac atc ctg aac ctg tac cga cga acc acc 439

Ala Asp Ser Thr Leu Cys His Ile Leu Asn Leu Tyr Arg Arg Thr Thr

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tgg cta cac cag gcc ctt cgg gaa ggc act cga gtc cag agt gta gag 487  
 Trp Leu His Gln Ala Leu Arg Glu Gly Thr Arg Val Gln Ser Val Glu

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cag atc cga gag gtg gct tca gga gct gcc agg atc cgt gga gag acc 535  
 Gln Ile Arg Glu Val Ala Ser Gly Ala Ala Arg Ile Arg Gly Glu Thr

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ttg ggc atc att gga cta ggt cgt gtg ggc cag gcg gtg gca ctt cgg 583  
 Leu Gly Ile Ile Gly Leu Gly Arg Val Gly Gln Ala Val Ala Leu Arg

170

175

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gca aag gct ttt ggc ttc aac gtc ctc ttc tat gat cca tac cta tct 631  
 Ala Lys Ala Phe Gly Phe Asn Val Leu Phe Tyr Asp Pro Tyr Leu Ser

185

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gat gga atc gag cgg gcc ctg ggg cta cag cgc gtg agc acg ctg cag 679  
 Asp Gly Ile Glu Arg Ala Leu Gly Leu Gln Arg Val Ser Thr Leu Gln

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gac ctg ctc ttc cac agt gac tgc gtt acc ctg cat tgc ggc ctc aat 727  
 Asp Leu Leu Phe His Ser Asp Cys Val Thr Leu His Cys Gly Leu Asn

215

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225

gag cac aac cac cac ctc atc aat gac ttt act gtc aag cag atg aga 775  
 Glu His Asn His His Leu Ile Asn Asp Phe Thr Val Lys Gln Met Arg

|   |     |     |     |      |
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| 230   | 235 | 240 | 245 |      |
| caa gga gcc ttt ctg gtg aac aca gcc cgt ggt ggc ctg gtg gat gag |     |     |     | 823  |
| Gln Gly Ala Phe Leu Val Asn Thr Ala Arg Gly Gly Leu Val Asp Glu |     |     |     |      |
|   | 250 | 255 | 260 |      |
| aag gca gtg gcc cag gcc ctg aag gaa ggg cgg atc cgt ggc gca gcg |     |     |     | 871  |
| Lys Ala Val Ala Gln Ala Leu Lys Glu Gly Arg Ile Arg Gly Ala Ala |     |     |     |      |
|   | 265 | 270 | 275 |      |
| ctg gac gtg cat gag tca gag ccc ttc agc ttt agc cag gga ccc tta |     |     |     | 919  |
| Leu Asp Val His Glu Ser Glu Pro Phe Ser Phe Ser Gln Gly Pro Leu |     |     |     |      |
|   | 280 | 285 | 290 |      |
| aag gat gca ccc aac ctc atc tgc aca ccc cat gct gca tgg tac agt |     |     |     | 967  |
| Lys Asp Ala Pro Asn Leu Ile Cys Thr Pro His Ala Ala Trp Tyr Ser |     |     |     |      |
|   | 295 | 300 | 305 |      |
| gag cag gcg tcc att gag atg aga gag gag gca gcc cgg gaa atc cgg |     |     |     | 1015 |
| Glu Gln Ala Ser Ile Glu Met Arg Glu Glu Ala Ala Arg Glu Ile Arg |     |     |     |      |
| 310   | 315 | 320 | 325 |      |
| cga gcc atc aca ggc cgg atc cca gat agc ttg aaa aac tgt gtc aac |     |     |     | 1063 |
| Arg Ala Ile Thr Gly Arg Ile Pro Asp Ser Leu Lys Asn Cys Val Asn |     |     |     |      |
|   | 330 | 335 | 340 |      |

aag gac cac ctg aca gcc gcc acg cac tgg gcc agc atg gac cct gct 1111  
 Lys Asp His Leu Thr Ala Ala Thr His Trp Ala Ser Met Asp Pro Ala

345

350

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gtg gtg cac cct gag ctc aat ggg gct gcc tac agc agg tac cct cca 1159  
 Val Val His Pro Glu Leu Asn Gly Ala Ala Tyr Ser Arg Tyr Pro Pro

360

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ggc gtc gtg agt gtg gcc ccc act ggc atc cca gct gct gtg gaa ggg 1207  
 Gly Val Val Ser Val Ala Pro Thr Gly Ile Pro Ala Ala Val Glu Gly

375

380

385

att gtt ccc agt gcc atg tcc ctg tct cat ggc ctg ccc cct gtg gcc 1255  
 Ile Val Pro Ser Ala Met Ser Leu Ser His Gly Leu Pro Pro Val Ala

390

395

400

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cac cca ccc cac gct ccc tct cct ggc cag act gtc aag cct gag gcg 1303  
 His Pro Pro His Ala Pro Ser Pro Gly Gln Thr Val Lys Pro Glu Ala

410

415

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gat aga gac cat acg agt gac cag ttg tagcctgtga ggagctgtcc 1350  
 Asp Arg Asp His Thr Ser Asp Gln Leu

425

430

agccttggca cctggtggag ggtgctgcac gctcttggac ccaagtgtgc agaggtggca 1410

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ccagggactg tccttagggg ctctcggtt atg atg gct gga gaa ggg tca acc 173

Met Met Ala Gly Glu Gly Ser Thr

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att act agc cgt atc aag aac ttg ctg agg tct cca tcc atc aaa tta 221

Ile Thr Ser Arg Ile Lys Asn Leu Leu Arg Ser Pro Ser Ile Lys Leu

10

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cgc aga agt aaa gca gga aac cgg aga gag gac ctc agc tcc aag gta 269

Arg Arg Ser Lys Ala Gly Asn Arg Arg Glu Asp Leu Ser Ser Lys Val  
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acc ttg gag aag gtc ctg gga gtg aca gta tct gga gga aga gga ctt 317  
 Thr Leu Glu Lys Val Leu Gly Val Thr Val Ser Gly Gly Arg Gly Leu  
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gct tgt gag ccc cga tct ggc tta gtt gcc tac cca gca ggg tgt gtg 365  
 Ala Cys Glu Pro Arg Ser Gly Leu Val Ala Tyr Pro Ala Gly Cys Val  
 60 65 70

gtc gtc ctc ttc aat ccc cgg aag cac aaa cag cac cac atc ctc aac 413  
 Val Val Leu Phe Asn Pro Arg Lys His Lys Gln His His Ile Leu Asn  
 75 80 85

agc tcc agg aaa acc att act gcc ctt gcc ttc tcc cct gat ggc aag 461  
 Ser Ser Arg Lys Thr Ile Thr Ala Leu Ala Phe Ser Pro Asp Gly Lys  
 90 95 100

tac ttg gtc act gga gag agt ggg cac atg cct gcc gtg cgg gtt tgg 509  
 Tyr Leu Val Thr Gly Glu Ser Gly His Met Pro Ala Val Arg Val Trp  
 105 110 115 120

gat gtg gct gaa cgt agc cag gtg gca gag cta cag gag cat aag tat 557  
 Asp Val Ala Glu Arg Ser Gln Val Ala Glu Leu Gln Glu His Lys Tyr  
 125 130 135

ggt gtg gct tgt gtg gct ttc tcc cca agt gcc aag tac att gtg tct 605  
 Gly Val Ala Cys Val Ala Phe Ser Pro Ser Ala Lys Tyr Ile Val Ser

140

145

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gtg ggc tac cag cat gac atg att gtc aac gtg tgg gcc tgg aag aaa 653  
 Val Gly Tyr Gln His Asp Met Ile Val Asn Val Trp Ala Trp Lys Lys

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165

aac att gta gtg gcc tcc aac aaa gta tcc agt cgg gta acc gca gtg 701  
 Asn Ile Val Val Ala Ser Asn Lys Val Ser Ser Arg Val Thr Ala Val

170

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180

tcc ttt tct gaa gac tgc agc tac ttt gtc act gca ggc aac cgg cac 749  
 Ser Phe Ser Glu Asp Cys Ser Tyr Phe Val Thr Ala Gly Asn Arg His

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atc aaa ttc tgg tac ctg gat gac agt aag acc tca aag gtg aac gcc 797  
 Ile Lys Phe Trp Tyr Leu Asp Asp Ser Lys Thr Ser Lys Val Asn Ala

205

210

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act gtg ccc ctg ctg ggc cgc tcg ggg ctg ctg ggg gag ctg agg aac 845  
 Thr Val Pro Leu Leu Gly Arg Ser Gly Leu Leu Gly Glu Leu Arg Asn

220

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aac ctg ttc act gat gtg gcc tgt ggc cga ggg gaa aag gct gat agc 893

Asn Leu Phe Thr Asp Val Ala Cys Gly Arg Gly Glu Lys Ala Asp Ser  
 235 240 245

act ttc tgt atc acg tcg tcg ggg ctg ctg tgc gag ttc agc gat cgc 941  
 Thr Phe Cys Ile Thr Ser Ser Gly Leu Leu Cys Glu Phe Ser Asp Arg  
 250 255 260

agg ctt ctg gac aaa tgg gtg gag cta agg aac aca gac agc ttc aca 989  
 Arg Leu Leu Asp Lys Trp Val Glu Leu Arg Asn Thr Asp Ser Phe Thr  
 265 270 275 280

acc act gtg gcc cac tgc atc tct gtc acc caa gaa tac atc ttc tgt 1037  
 Thr Thr Val Ala His Cys Ile Ser Val Thr Gln Glu Tyr Ile Phe Cys  
 285 290 295

ggc tgt gct gat ggc acg gtg cgc ctt ttc aat cct tcc aac ctg cac 1085  
 Gly Cys Ala Asp Gly Thr Val Arg Leu Phe Asn Pro Ser Asn Leu His  
 300 305 310

ttc ctc agt acc cta ccc aga ccc cat gct ctt gga aca gac att gcc 1133  
 Phe Leu Ser Thr Leu Pro Arg Pro His Ala Leu Gly Thr Asp Ile Ala  
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agc atc act gag gcc agt cgc ctc ttt tct gga ggg gtc aat gca agg 1181  
 Ser Ile Thr Glu Ala Ser Arg Leu Phe Ser Gly Gly Val Asn Ala Arg  
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tac cca gac acc att gcc ttg acc ttc gat cca act aat cag tgg cta 1229

Tyr Pro Asp Thr Ile Ala Leu Thr Phe Asp Pro Thr Asn Gln Trp Leu

345 350 355 360

tct tgt gta tac aac gac cac agc ata tat gtt tgg gat gtg agg gac 1277

Ser Cys Val Tyr Asn Asp His Ser Ile Tyr Val Trp Asp Val Arg Asp

365 370 375

ccc aag aaa gtg ggg aag gtg tac tcc gct ctg tat cac tcc tcc tgt 1325

Pro Lys Lys Val Gly Lys Val Tyr Ser Ala Leu Tyr His Ser Ser Cys

380 385 390

gtc tgg agt gtg gag gtc tac cct gag atc aag gac agt cac cag gcc 1373

Val Trp Ser Val Glu Val Tyr Pro Glu Ile Lys Asp Ser His Gln Ala

395 400 405

tgt ctt ccc ctc agt tcc ttt att act tgc tcc tca gac aac acc atc 1421

Cys Leu Pro Leu Ser Ser Phe Ile Thr Cys Ser Ser Asp Asn Thr Ile

410 415 420

cgc ctg tgg aac aca gag agc tct ggg gta cat ggc tct acc ctg cac 1469

Arg Leu Trp Asn Thr Glu Ser Ser Gly Val His Gly Ser Thr Leu His

425 430 435 440

cgt aac atc ctc agc aat gat ctc att aag atc atc tat gtg gat ggg 1517

Arg Asn Ile Leu Ser Asn Asp Leu Ile Lys Ile Ile Tyr Val Asp Gly

445

450

455

aac act cag gct ttg ttg gac act gag ctg cct gga gga gac aaa gct 1565

Asn Thr Gln Ala Leu Leu Asp Thr Glu Leu Pro Gly Gly Asp Lys Ala

460

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gat ggg tcg ctg atg gac ccc cga gtg ggc atc cgg tcc gtg tgt att 1613

Asp Gly Ser Leu Met Asp Pro Arg Val Gly Ile Arg Ser Val Cys Ile

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agc ccc aat gga cag cac ctg gcc tcg gga gac cgc atg ggg aca ctt 1661

Ser Pro Asn Gly Gln His Leu Ala Ser Gly Asp Arg Met Gly Thr Leu

490

495

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agg ata cat gaa ctg cag tcc ctg agt gag atg ctg aaa gtg gag gcc 1709

Arg Ile His Glu Leu Gln Ser Leu Ser Glu Met Leu Lys Val Glu Ala

505

510

515

520

cac gac tct gag atc ttg tgc ctg gag tac tct aag cca gac aca ggt 1757

His Asp Ser Glu Ile Leu Cys Leu Glu Tyr Ser Lys Pro Asp Thr Gly

525

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ttg aaa ctg cta gca tcg gca agc cgg gac cgt ctg atc cac gag ctg 1805

Leu Lys Leu Leu Ala Ser Ala Ser Arg Asp Arg Leu Ile His Glu Leu

540

545

550

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|---|------|
| gat gct ggc cgg gaa tat agt cta cag cag aca ctg gat gag cat tca | 1853 |
| Asp Ala Gly Arg Glu Tyr Ser Leu Gln Gln Thr Leu Asp Glu His Ser |      |
| 555 560 565   |      |
| tct tcc atc act gct gtc aag ttt gca gcc agt gat ggg caa gtg cga | 1901 |
| Ser Ser Ile Thr Ala Val Lys Phe Ala Ala Ser Asp Gly Gln Val Arg |      |
| 570 575 580   |      |
| atg atc agc tgt ggt gca gac aag agc att tac ttc cga act gca cag | 1949 |
| Met Ile Ser Cys Gly Ala Asp Lys Ser Ile Tyr Phe Arg Thr Ala Gln |      |
| 585 590 595 600   |      |
| aag tct gga gaa gga gta cag ttt aca cga acg cac cac gtg gta cgg | 1997 |
| Lys Ser Gly Glu Gly Val Gln Phe Thr Arg Thr His His Val Val Arg |      |
| 605 610 615   |      |
| aag aca act ctc tat gac atg gat gtg gag ccc agc tgg aag tac acg | 2045 |
| Lys Thr Thr Leu Tyr Asp Met Asp Val Glu Pro Ser Trp Lys Tyr Thr |      |
| 620 625 630   |      |
| gcc atc ggc tgc caa gac cgg aat att cgg atc ttt aac att agc agc | 2093 |
| Ala Ile Gly Cys Gln Asp Arg Asn Ile Arg Ile Phe Asn Ile Ser Ser |      |
| 635 640 645   |      |
| gga aag cag aaa aag ctg ttt aaa ggg tca cag ggt gaa gat ggc act | 2141 |

Gly Lys Gln Lys Lys Leu Phe Lys Gly Ser Gln Gly Glu Asp Gly Thr

650

655

660

ctc att aag gtg cag aca gac ccc tca ggg atc tac att gcc act agc 2189

Leu Ile Lys Val Gln Thr Asp Pro Ser Gly Ile Tyr Ile Ala Thr Ser

665

670

675

680

tgt tcc gat aag aat ctc tcc att ttt gac ttc tcc tca ggc gag tgt 2237

Cys Ser Asp Lys Asn Leu Ser Ile Phe Asp Phe Ser Ser Gly Glu Cys

685

690

695

gtg gcc acc atg ttt ggc cac tca gag att gtc act ggc atg aaa ttt 2285

Val Ala Thr Met Phe Gly His Ser Glu Ile Val Thr Gly Met Lys Phe

700

705

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agt aac gat tgc aaa cat ctc atc tct gtg tca ggg gac agc tgc atc 2333

Ser Asn Asp Cys Lys His Leu Ile Ser Val Ser Gly Asp Ser Cys Ile

715

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ttt gtc tgg cgt ctg agc tct gag atg acc atc agc atg agg cag cgc 2381

Phe Val Trp Arg Leu Ser Ser Glu Met Thr Ile Ser Met Arg Gln Arg

730

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ctg cgt gag cgg cgg cag cgc cag cga ggg atc aag cag caa gga cca 2429

Leu Arg Glu Arg Arg Gln Arg Gln Arg Gly Ile Lys Gln Gln Gly Pro

745

750

755

760

acg tct ccc cag agg gct tct gga gcc aag cag cac cat gct cca gtg 2477  
 Thr Ser Pro Gln Arg Ala Ser Gly Ala Lys Gln His His Ala Pro Val  
 765 770 775

gta ccc cct tct gga cca gct ctt tcc tca gac agt gac aag gag gga 2525  
 Val Pro Pro Ser Gly Pro Ala Leu Ser Ser Asp Ser Asp Lys Glu Gly  
 780 785 790

gaa gat gag ggt act gaa gaa gaa gaa ttg cca gct ctg ccc atc ctt 2573  
 Glu Asp Glu Gly Thr Glu Glu Glu Glu Leu Pro Ala Leu Pro Ile Leu  
 795 800 805

agc aag agc acc aag aaa gaa cta gcc tca ggc tct agt cca gcc ttg 2621  
 Ser Lys Ser Thr Lys Lys Glu Leu Ala Ser Gly Ser Ser Pro Ala Leu  
 810 815 820

ctc cga agc ctg tcc cac tgg gaa atg agt cgg gca caa gag acc atg 2669  
 Leu Arg Ser Leu Ser His Trp Glu Met Ser Arg Ala Gln Glu Thr Met  
 825 830 835 840

gag tac ctg gac cca gct cct gta gct aac aca gga cct aaa aga aga 2717  
 Glu Tyr Leu Asp Pro Ala Pro Val Ala Asn Thr Gly Pro Lys Arg Arg  
 845 850 855

ggg cgc tgg gct cag cca ggc gtg gag ctg agt gtt cgc tcc atg ttg 2765

Gly Arg Trp Ala Gln Pro Gly Val Glu Leu Ser Val Arg Ser Met Leu

860

865

870

gac ctg aga cag ata gag acc tta gcc cca agc cct cga ggc ccc agc 2813

Asp Leu Arg Gln Ile Glu Thr Leu Ala Pro Ser Pro Arg Gly Pro Ser

875

880

885

cag gac tca ctg gct gtg tcc cca gct ggt cct ggg aag cat ggt cca 2861

Gln Asp Ser Leu Ala Val Ser Pro Ala Gly Pro Gly Lys His Gly Pro

890

895

900

cag gcc cct gag ctg tca tgt gtc agt cag aat gaa agg gcc cct cgg 2909

Gln Ala Pro Glu Leu Ser Cys Val Ser Gln Asn Glu Arg Ala Pro Arg

905

910

915

920

ctt cag acc tcc caa ccc tgc tcc tgc ccc gac att atc caa ttg ttg 2957

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tca caa gag gaa gga gtc ttt gcc caa gat ctg gag cct gca ccc att 3005

Ser Gln Glu Glu Gly Val Phe Ala Gln Asp Leu Glu Pro Ala Pro Ile

940

945

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gaa gat ggt att gtc tac ccg gaa ccc agt gac agc cct acc atg gat 3053

Glu Asp Gly Ile Val Tyr Pro Glu Pro Ser Asp Ser Pro Thr Met Asp

955

960

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acc agt gcg ttt cag gtg cag gct cca acc gga gga tcc cta gga aga 3101  
 Thr Ser Ala Phe Gln Val Gln Ala Pro Thr Gly Gly Ser Leu Gly Arg

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975

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atg tac cca ggc agc agg ggc tca gaa aag cac agt cct gac agt gca 3149  
 Met Tyr Pro Gly Ser Arg Gly Ser Glu Lys His Ser Pro Asp Ser Ala

985

990

995

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tgc tct gtg gat tac agc agc agc cgg ctt tcc agc cct gaa cac cct 3197  
 Cys Ser Val Asp Tyr Ser Ser Ser Arg Leu Ser Ser Pro Glu His Pro

1005

1010

1015

aat gaa gac tct gag agc aca gag ccc cta agt gtg gat ggc atc tcc 3245  
 Asn Glu Asp Ser Glu Ser Thr Glu Pro Leu Ser Val Asp Gly Ile Ser

1020

1025

1030

tca gac ctg gaa gag cca gcc gag ggt gat gaa gac gag gaa gaa gag 3293  
 Ser Asp Leu Glu Glu Pro Ala Glu Gly Asp Glu Asp Glu Glu Glu Glu

1035

1040

1045

gga ggc act ggc ctc tgt ggg cta cag gaa ggc ggc cct cgt acc cca 3341  
 Gly Gly Thr Gly Leu Cys Gly Leu Gln Glu Gly Gly Pro Arg Thr Pro

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1055

1060

gat cag gaa cag ttt cta aaa cag ctc ttt gag act ctg gcc aat ggg 3389





gac aac agc tgg gcc tcc aag aaa atg gct gca acc cgg cct tta gct 3725  
 Asp Asn Ser Trp Ala Ser Lys Lys Met Ala Ala Thr Arg Pro Leu Ala  
 1180 1185 1190

gga ctc cag aaa gcc cag tct gtg cat agt ttg gta cca cag gat gag 3773  
 Gly Leu Gln Lys Ala Gln Ser Val His Ser Leu Val Pro Gln Asp Glu  
 1195 1200 1205

gtg cct tca tca cgt cca ctg ctc ttc cgg gag gca gag acc cag ggc 3821  
 Val Pro Ser Ser Arg Pro Leu Leu Phe Arg Glu Ala Glu Thr Gln Gly  
 1210 1215 1220

agc tta gga tcc ctg cca caa gct ggt ggc tgc tca tct cag ccc cac 3869  
 Ser Leu Gly Ser Leu Pro Gln Ala Gly Gly Cys Ser Ser Gln Pro His  
 1225 1230 1235 1240

tcc tac cag aac cac acc acc agt tct atg gcc aag cta gcg cgt agt 3917  
 Ser Tyr Gln Asn His Thr Thr Ser Ser Met Ala Lys Leu Ala Arg Ser  
 1245 1250 1255

att tct gtt ggc gag aat ccg ggc ctg gca act gaa cct caa gct cct 3965  
 Ile Ser Val Gly Glu Asn Pro Gly Leu Ala Thr Glu Pro Gln Ala Pro  
 1260 1265 1270

gca ccg atc cga atc tca cca ttc aac aaa cta gct ctg cct agc agg 4013

Ala Pro Ile Arg Ile Ser Pro Phe Asn Lys Leu Ala Leu Pro Ser Arg

1275

1280

1285

gct cac ctt gtc ctg gac atc ccc aaa cca ctt cct gac cgt cct act 4061

Ala His Leu Val Leu Asp Ile Pro Lys Pro Leu Pro Asp Arg Pro Thr

1290

1295

1300

ctg acc aca ttc tca cct gta tcc aag ggc ctg acc cac aat gaa aca 4109

Leu Thr Thr Phe Ser Pro Val Ser Lys Gly Leu Thr His Asn Glu Thr

1305

1310

1315

1320

gaa caa tcg ggg ccc ctt cgt gag cct agg aag gct cat act aca gtt 4157

Glu Gln Ser Gly Pro Leu Arg Glu Pro Arg Lys Ala His Thr Thr Val

1325

1330

1335

gaa aag cac tcc tgt tta ggg gag ggt act act cat aaa tct agg aca 4205

Glu Lys His Ser Cys Leu Gly Glu Gly Thr Thr His Lys Ser Arg Thr

1340

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1350

gag tgc cag gct tat cct gga ccc aac cac ccc tgt cgc cag caa ctg 4253

Glu Cys Gln Ala Tyr Pro Gly Pro Asn His Pro Cys Arg Gln Gln Leu

1355

1360

1365

cca gtc aac aac ctt ctc caa gct gag agc ttg cag ccc ctg tcc cct 4301

Pro Val Asn Asn Leu Leu Gln Ala Glu Ser Leu Gln Pro Leu Ser Pro

1370

1375

1380

gag aag act cgt aac ccc gtg gaa agc agc agg cca ggg gta gcc ctg 4349

Glu Lys Thr Arg Asn Pro Val Glu Ser Ser Arg Pro Gly Val Ala Leu

1385

1390

1395

1400

agc cag gac tca gaa ctg gcc ttg agt ctg caa cag tgt gaa cag ctc 4397

Ser Gln Asp Ser Glu Leu Ala Leu Ser Leu Gln Gln Cys Glu Gln Leu

1405

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1415

gtg gca gag ctc cag ggg aat gta cgc cag gca gtg gag ctc tac cgc 4445

Val Ala Glu Leu Gln Gly Asn Val Arg Gln Ala Val Glu Leu Tyr Arg

1420

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gcg gtg acc agc tgt aag aca cct tcg gca gag caa agt cac atc acc 4493

Ala Val Thr Ser Cys Lys Thr Pro Ser Ala Glu Gln Ser His Ile Thr

1435

1440

1445

cgt ctc ctg aga gac acc ttc tct ccg gtg cga cag gag ctc gag gtt 4541

Arg Leu Leu Arg Asp Thr Phe Ser Pro Val Arg Gln Glu Leu Glu Val

1450

1455

1460

ctg gct ggg gca gtg ctg tcc agc cca ggt ggc agc cct ggg gct gtg 4589

Leu Ala Gly Ala Val Leu Ser Ser Pro Gly Gly Ser Pro Gly Ala Val

1465

1470

1475

1480

gcg gct gag cag acg cag gcc ctg ttg gag caa tac tcc gag cta ctg 4637

Ala Ala Glu Gln Thr Gln Ala Leu Leu Glu Gln Tyr Ser Glu Leu Leu

1485

1490

1495

cta aga gct gtg gag cgg cgc atg gag cgc aga ctc tgagctcctg a 4684

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1505

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Ser Ser Lys Tyr Ser Asn Glu Ser Arg Ser Gln Ala Asp Ser Gly Phe

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5

10

15

ctg ggg ctg cgg ccg acc tcg gtg gat ccc gct ctg agg cgg cgg cgg 96

Leu Gly Leu Arg Pro Thr Ser Val Asp Pro Ala Leu Arg Arg Arg Arg

20

25

30

cgg ggc ccc aga aac aag aag cgc ggc tgg agg agg ctc gcc gag gag 144  
 Arg Gly Pro Arg Asn Lys Lys Arg Gly Trp Arg Arg Leu Ala Glu Glu

35

40

45

cgg ctg ggg tta gag gtc gac cag ttc ctg gaa gac gtc cgg cta cag 192  
 Pro Leu Gly Leu Glu Val Asp Gln Phe Leu Glu Asp Val Arg Leu Gln

50

55

60

gag cgc acg acc ggt ggc ttg ttg gca gag gcc cca aac gaa aag ctc 240  
 Glu Arg Thr Thr Gly Gly Leu Leu Ala Glu Ala Pro Asn Glu Lys Leu

65

70

75

80

ttc ttc gtg gac aca gga ttc aag aga aaa gaa cca aga aag aag agg 288  
 Phe Phe Val Asp Thr Gly Phe Lys Arg Lys Glu Pro Arg Lys Lys Arg

85

90

95

acc ttg gtc cag aag aag tca cag cgt ctc cag aaa ccc tta cgg gtt 336  
 Thr Leu Val Gln Lys Lys Ser Gln Arg Leu Gln Lys Pro Leu Arg Val

100

105

110

gac ctt gcc ctt gag aat cat tct aag atc cct gct ccc aaa gac atc 384  
 Asp Leu Ala Leu Glu Asn His Ser Lys Ile Pro Ala Pro Lys Asp Ile

115

120

125

ctc gca cat cag gtc cct aat gcc aag aag ctc agg cga aag gag gag 432  
 Leu Ala His Gln Val Pro Asn Ala Lys Lys Leu Arg Arg Lys Glu Glu

|   |     |     |     |
|---|-----|-----|-----|
| 130   | 135 | 140 |     |
| tta tgg gag aaa ctg gca aag cag ggc gaa ctg ccc agg gat gtg cgc |     |     | 480 |
| Leu Trp Glu Lys Leu Ala Lys Gln Gly Glu Leu Pro Arg Asp Val Arg |     |     |     |
| 145   | 150 | 155 | 160 |
| aag gca cag gcc cga ctc ctt agc cct ccc aca cca aag gcc aaa cct |     |     | 528 |
| Lys Ala Gln Ala Arg Leu Leu Ser Pro Pro Thr Pro Lys Ala Lys Pro |     |     |     |
|   | 165 | 170 | 175 |
| ggg ccc cag gac atc att gag cga ccc ttc tat gac ctc tgg aac cca |     |     | 576 |
| Gly Pro Gln Asp Ile Ile Glu Arg Pro Phe Tyr Asp Leu Trp Asn Pro |     |     |     |
|   | 180 | 185 | 190 |
| gac aac cct ctg gac acg cct ttg att ggt cag gat gca ttt ttt ctg |     |     | 624 |
| Asp Asn Pro Leu Asp Thr Pro Leu Ile Gly Gln Asp Ala Phe Phe Leu |     |     |     |
|   | 195 | 200 | 205 |
| gaa cag acc aag aag aaa ggc gtg agg cgg cca caa cgc ctc cac atc |     |     | 672 |
| Glu Gln Thr Lys Lys Lys Gly Val Arg Arg Pro Gln Arg Leu His Ile |     |     |     |
|   | 210 | 215 | 220 |
| aag cct tcc cag gtg cct gca gtg gag gtg att cct gca gga gcc tcc |     |     | 720 |
| Lys Pro Ser Gln Val Pro Ala Val Glu Val Ile Pro Ala Gly Ala Ser |     |     |     |
| 225   | 230 | 235 | 240 |

tac aac cca acc tt

Tyr Asn Pro Thr

<210> 8

<211> 1469

<212> DNA

<213> Mouse

<220>

<221> CDS

<222> (7).. (1458)

<400> 8

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Met Ala Ala Gly Gly Asn Arg Asp Gly Glu Lys Arg Gly Ser Arg  
1 5 10 15

agc cag gcg gac tct ggc ttc ctg ggg ctg cgg ccg acc tcg gtg gat 99  
Ser Gln Ala Asp Ser Gly Phe Leu Gly Leu Arg Pro Thr Ser Val Asp  
20 25 30

ccc gct ctg agg cgg cgg cgg cgg ggc ccc aga aac aag aag cgc ggc 147  
Pro Ala Leu Arg Arg Arg Arg Arg Gly Pro Arg Asn Lys Lys Arg Gly  
35 40 45

tgg agg agg ctc gcc gag gag ccg ctg ggg tta gag gtc gac cag ttc 195  
Trp Arg Arg Leu Ala Glu Glu Pro Leu Gly Leu Glu Val Asp Gln Phe  
50 55 60

ctg gaa gac gtc cgg cta cag gag cgc acg acc ggt ggc ttg ttg gca 243

Leu Glu Asp Val Arg Leu Gln Glu Arg Thr Thr Gly Gly Leu Leu Ala  
65 70 75

gag gcc cca aac gaa aag ctc ttc ttc gtg gac aca gga ttc aag aga 291  
Glu Ala Pro Asn Glu Lys Leu Phe Phe Val Asp Thr Gly Phe Lys Arg  
80 85 90 95

aaa gaa cca aga aag aag agg acc ttg gtc cag aag aag tca cag cgt 339  
Lys Glu Pro Arg Lys Lys Arg Thr Leu Val Gln Lys Lys Ser Gln Arg  
100 105 110

ctc cag aaa ccc tta cgg gtt gac ctt gcc ctt gag aat cat tct aag 387  
Leu Gln Lys Pro Leu Arg Val Asp Leu Ala Leu Glu Asn His Ser Lys  
115 120 125

atc cct gct ccc aaa gac atc ctc gca cat cag gtc cct aat gcc aag 435  
Ile Pro Ala Pro Lys Asp Ile Leu Ala His Gln Val Pro Asn Ala Lys  
130 135 140

aag ctc agg cga aag gag gag tta tgg gag aaa ctg gca aag cag ggc 483  
Lys Leu Arg Arg Lys Glu Glu Leu Trp Glu Lys Leu Ala Lys Gln Gly  
145 150 155

gaa ctg ccc agg gat gtg cgc aag gca cag gcc cga ctc ctt agc cct 531  
Glu Leu Pro Arg Asp Val Arg Lys Ala Gln Ala Arg Leu Leu Ser Pro  
160 165 170 175

ccc aca cca aag gcc aaa cct ggg ccc cag gac atc att gag cga ccc 579  
Pro Thr Pro Lys Ala Lys Pro Gly Pro Gln Asp Ile Ile Glu Arg Pro  
180 185 190

ttc tat gac ctc tgg aac cca gac aac cct ctg gac acg cct ttg att 627  
Phe Tyr Asp Leu Trp Asn Pro Asp Asn Pro Leu Asp Thr Pro Leu Ile  
195 200 205

ggt cag gat gca ttt ttt ctg gaa cag acc aag aag aaa ggc gtg agg 675  
Gly Gln Asp Ala Phe Phe Leu Glu Gln Thr Lys Lys Lys Gly Val Arg



|   |     |     |      |
|---|-----|-----|------|
| 210   | 215 | 220 |      |
| cgg cca caa cgc ctc cac atc aag cct tcc cag gtg cct gca gtg gag |     |     | 723  |
| Arg Pro Gln Arg Leu His Ile Lys Pro Ser Gln Val Pro Ala Val Glu |     |     |      |
| 225   | 230 | 235 |      |
| gtg att cct gca gga gcc tcc tac aac cca acc ttt gaa gat cac cag |     |     | 771  |
| Val Ile Pro Ala Gly Ala Ser Tyr Asn Pro Thr Phe Glu Asp His Gln |     |     |      |
| 240   | 245 | 250 | 255  |
| gcc ctg ctt cga gag gcc cat gag gtg gag ctg cag cgt gag aaa gag |     |     | 819  |
| Ala Leu Leu Arg Glu Ala His Glu Val Glu Leu Gln Arg Glu Lys Glu |     |     |      |
| 260   | 265 | 270 |      |
| gca gaa aag ctg gag cga cag ctg gcc ctg ccc acc tca gag caa gct |     |     | 867  |
| Ala Glu Lys Leu Glu Arg Gln Leu Ala Leu Pro Thr Ser Glu Gln Ala |     |     |      |
| 275   | 280 | 285 |      |
| gcc acc cag gag tcc gtg ttt cgg gag atg tgt gag ggc ctg ctg gag |     |     | 915  |
| Ala Thr Gln Glu Ser Val Phe Arg Glu Met Cys Glu Gly Leu Leu Glu |     |     |      |
| 290   | 295 | 300 |      |
| gag tct gat ggt gag gat gag cat gag gca ggc cgt gcc ggg cag cca |     |     | 963  |
| Glu Ser Asp Gly Glu Asp Glu His Glu Ala Gly Arg Ala Gly Gln Pro |     |     |      |
| 305   | 310 | 315 |      |
| gag gct ggt gat ggg acc acc gag atc tca ccc act ggt gct gct ggt |     |     | 1011 |
| Glu Ala Gly Asp Gly Thr Thr Glu Ile Ser Pro Thr Gly Ala Ala Gly |     |     |      |
| 320   | 325 | 330 | 335  |
| cct gag aag agg atg gag aag aag acg gag cag cag cgg cgg cgg gag |     |     | 1059 |
| Pro Glu Lys Arg Met Glu Lys Lys Thr Glu Gln Gln Arg Arg Arg Glu |     |     |      |
| 340   | 345 | 350 |      |
| aaa gct gct cgc aag ctg cgg gtg cag cag gct gca ctg agg gca gcc |     |     | 1107 |
| Lys Ala Ala Arg Lys Leu Arg Val Gln Gln Ala Ala Leu Arg Ala Ala |     |     |      |
| 355   | 360 | 365 |      |

|   |      |
|---|------|
| cgg ctt cag cac caa gaa ctt ttc agg ctg cgt ggg atc aag gcc cag | 1155 |
| Arg Leu Gln His Gln Glu Leu Phe Arg Leu Arg Gly Ile Lys Ala Gln |      |
| 370 375 380   |      |
| gtg gcc cga agg ctg gca gaa ctg gca cgc cgg agg gag cag cgg cgc | 1203 |
| Val Ala Arg Arg Leu Ala Glu Leu Ala Arg Arg Arg Glu Gln Arg Arg |      |
| 385 390 395   |      |
| ata cgg cga ctg gca gag gct gac aag ccc cga agg ctg gga cgg ctc | 1251 |
| Ile Arg Arg Leu Ala Glu Ala Asp Lys Pro Arg Arg Leu Gly Arg Leu |      |
| 400 405 410 415   |      |
| aag tac cag gct cct gac att gat gtg cag ctc agc tct gag ttg tct | 1299 |
| Lys Tyr Gln Ala Pro Asp Ile Asp Val Gln Leu Ser Ser Glu Leu Ser |      |
| 420 425 430   |      |
| ggc tca ctc agg aca ctg aag cca gaa ggt cac att ctc cga gac agg | 1347 |
| Gly Ser Leu Arg Thr Leu Lys Pro Glu Gly His Ile Leu Arg Asp Arg |      |
| 435 440 445   |      |
| ttc aag agc ttc cag aag aga aat atg att gag ccc cga gaa cga gcc | 1395 |
| Phe Lys Ser Phe Gln Lys Arg Asn Met Ile Glu Pro Arg Glu Arg Ala |      |
| 450 455 460   |      |
| aag ttc aag cgc aaa tac aaa gtg aag ctg gtg gag aag cgg gcc tac | 1443 |
| Lys Phe Lys Arg Lys Tyr Lys Val Lys Leu Val Glu Lys Arg Ala Tyr |      |
| 465 470 475   |      |
| cgt gag att cag ttg tag ctgtgcagat g                            | 1469 |
| Arg Glu Ile Gln Leu   |      |
| 480   |      |

<210> 9

<211> 1305

<212> PRT

<213> Mouse

<400> 9

Met Met Glu Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln

1

5

10

15

Asp Asp Tyr Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu

20

25

30

Ala Gly Ser Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp

35

40

45

Glu Glu Val Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu

50

55

60

Asn Leu Asp Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu

65

70

75

80

Glu Leu Leu Arg Glu Asp Asn Glu Gln Leu Leu Thr Gln Tyr Glu Arg

85

90

95

Glu Lys Ala Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu

100

105

110

Asp Ala Leu Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His

|   |     |     |
|---|-----|-----|
| 115   | 120 | 125 |
| Tyr Glu Phe Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala |     |     |
| 130   | 135 | 140 |
| Asp Gln Ile Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu |     |     |
| 145   | 150 | 155 |
| Tyr Asn Ala Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val |     |     |
| 165   | 170 | 175 |
| Glu His Ile Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln |     |     |
| 180   | 185 | 190 |
| Thr Glu Ser Ser Leu Pro Gly Arg Arg Lys Glu Arg Pro Thr Ser Leu |     |     |
| 195   | 200 | 205 |
| Asn Val Phe Pro Leu Ala Asp Gly Met Cys Pro Asn Asp Glu Met Ser |     |     |
| 210   | 215 | 220 |
| Glu Ser Gly Gln Ser Ser Ala Ala Ala Thr Pro Ser Thr Thr Gly Thr |     |     |
| 225   | 230 | 235 |
| Lys Ser Asn Thr Pro Thr Ser Ser Val Pro Ser Ala Ala Val Thr Pro |     |     |
| 245   | 250 | 255 |

Leu Asn Glu Ser Leu Gln Pro Leu Gly Asp Tyr Val Ser Val Thr Lys  
260 265 270

Asn Asn Lys Gln Ala Arg Glu Lys Arg Asn Ser Arg Asn Met Glu Val  
275 280 285

Gln Val Thr Gln Glu Met Arg Asn Val Ser Ile Gly Met Gly Ser Ser  
290 295 300

Asp Glu Trp Ser Asp Val Gln Asp Ile Ile Asp Ser Thr Pro Glu Leu  
305 310 315 320

Asp Val Cys Pro Glu Thr Arg Leu Glu Arg Thr Gly Ser Ser Pro Thr  
325 330 335

Gln Gly Ile Val Asn Lys Ala Phe Gly Ile Asn Thr Asp Ser Leu Tyr  
340 345 350

His Glu Leu Ser Thr Ala Gly Ser Glu Val Ile Gly Asp Val Asp Glu  
355 360 365

Gly Ala Asp Leu Leu Gly Glu Phe Ser Val Arg Asp Asp Phe Phe Gly  
370 375 380

Met Gly Lys Glu Val Gly Asn Leu Leu Leu Glu Asn Ser Gln Leu Leu  
385 390 395 400

Glu Thr Lys Asn Ala Leu Asn Val Val Lys Asn Asp Leu Ile Ala Lys  
405 410 415

Val Asp Gln Leu Ser Gly Glu Gln Glu Val Leu Lys Gly Glu Leu Glu  
420 425 430

Ala Ala Lys Gln Ala Lys Val Lys Leu Glu Asn Arg Ile Lys Glu Leu  
435 440 445

Glu Glu Glu Leu Lys Arg Val Lys Ser Glu Ala Val Thr Ala Arg Arg  
450 455 460

Glu Pro Arg Glu Glu Val Glu Asp Val Ser Ser Tyr Leu Cys Thr Glu  
465 470 475 480

Leu Asp Lys Ile Pro Met Ala Gln Arg Arg Arg Phe Thr Arg Val Glu  
485 490 495

Met Ala Arg Val Leu Met Glu Arg Asn Gln Tyr Lys Glu Arg Leu Met  
500 505 510

Glu Leu Gln Glu Ala Val Arg Trp Thr Glu Met Ile Arg Ala Ser Arg  
515 520 525

Glu His Pro Ser Val Gln Glu Lys Lys Lys Ser Thr Ile Trp Gln Phe

|   |     |     |     |
|---|-----|-----|-----|
| 530   | 535 | 540 |     |
| Phe Ser Arg Leu Phe Ser Ser Ser Ser Ser Pro Pro Pro Ala Lys Arg |     |     |     |
| 545   | 550 | 555 | 560 |
| Ser Tyr Pro Ser Val Asn Ile His Tyr Lys Ser Pro Thr Ala Ala Gly |     |     |     |
|   | 565 | 570 | 575 |
| Phe Ser Gln Arg Arg Ser His Ala Leu Cys Gln Ile Ser Ala Gly Ser |     |     |     |
|   | 580 | 585 | 590 |
| Arg Pro Leu Glu Phe Phe Pro Asp Asp Asp Cys Thr Ser Ser Ala Arg |     |     |     |
|   | 595 | 600 | 605 |
| Arg Glu Gln Lys Arg Glu Gln Tyr Arg Gln Val Arg Glu His Val Arg |     |     |     |
|   | 610 | 615 | 620 |
| Asn Asp Asp Gly Arg Leu Gln Ala Cys Gly Trp Ser Leu Pro Ala Lys |     |     |     |
|   | 625 | 630 | 635 |
|   |     |     | 640 |
| Tyr Lys Gln Leu Ser Pro Asn Gly Gly Gln Glu Asp Thr Arg Met Lys |     |     |     |
|   | 645 | 650 | 655 |
| Asn Val Pro Val Pro Val Tyr Cys Arg Pro Leu Val Glu Lys Asp Pro |     |     |     |
|   | 660 | 665 | 670 |

Ser Thr Lys Leu Trp Cys Ala Ala Gly Val Asn Leu Ser Gly Trp Lys  
675 680 685

Pro His Glu Glu Asp Ser Ser Asn Gly Pro Lys Pro Val Pro Gly Arg  
690 695 700

Asp Pro Leu Thr Cys Asp Arg Glu Gly Glu Gly Glu Pro Lys Ser Thr  
705 710 715 720

His Pro Ser Pro Glu Lys Lys Lys Ala Lys Glu Thr Pro Glu Ala Asp  
725 730 735

Ala Thr Ser Ser Arg Val Trp Ile Leu Thr Ser Thr Leu Thr Thr Ser  
740 745 750

Lys Val Val Ile Ile Asp Ala Asn Gln Pro Gly Thr Ile Val Asp Gln  
755 760 765

Phe Thr Val Cys Asn Ala His Val Leu Cys Ile Ser Ser Ile Pro Ala  
770 775 780

Ala Ser Asp Ser Asp Tyr Pro Pro Gly Glu Met Phe Leu Asp Ser Asp  
785 790 795 800

Val Asn Pro Glu Asp Ser Gly Ala Asp Gly Val Leu Ala Gly Ile Thr  
805 810 815



Leu Val Gly Cys Ala Thr Arg Cys Asn Val Pro Arg Ser Asn Cys Ser

820

825

830

Ser Arg Gly Asp Thr Pro Val Leu Asp Lys Gly Gln Gly Asp Val Ala

835

840

845

Thr Thr Ala Asn Gly Lys Val Asn Pro Ser Gln Ser Thr Glu Glu Ala

850

855

860

Thr Glu Ala Thr Glu Val Pro Asp Pro Gly Pro Ser Glu Ser Glu Ala

865

870

875

880

Thr Thr Val Arg Pro Gly Pro Leu Thr Glu His Val Phe Thr Asp Pro

885

890

895

Ala Pro Thr Pro Ser Ser Ser Thr Gln Pro Ala Ser Glu Asn Gly Ser

900

905

910

Glu Ser Asn Gly Thr Ile Val Gln Pro Gln Val Glu Pro Ser Gly Glu

915

920

925

Leu Ser Thr Thr Thr Ser Ser Ala Ala Pro Thr Met Trp Leu Gly Ala

930

935

940

Gln Asn Gly Trp Leu Tyr Val His Ser Ala Val Ala Asn Trp Lys Lys

|   |      |      |      |
|---|------|------|------|
| 945   | 950  | 955  | 960  |
| Cys Leu His Ser Ile Lys Leu Lys Asp Ser Val Leu Ser Leu Val His |      |      |      |
|   | 965  | 970  | 975  |
| Val Lys Gly Arg Val Leu Val Ala Leu Ala Asp Gly Thr Leu Ala Ile |      |      |      |
|   | 980  | 985  | 990  |
| Phe His Arg Gly Glu Asp Gly Gln Trp Asp Leu Ser Asn Tyr His Leu |      |      |      |
|   | 995  | 1000 | 1005 |
| Met Asp Leu Gly His Pro His His Ser Ile Arg Cys Met Ala Val Val |      |      |      |
|   | 1010 | 1015 | 1020 |
| Asn Asp Arg Val Trp Cys Gly Tyr Lys Asn Lys Val His Val Ile Gln |      |      |      |
| 1025  | 1030 | 1035 | 1040 |
| Pro Lys Thr Met Gln Ile Glu Lys Ser Phe Asp Ala His Pro Arg Arg |      |      |      |
|   | 1045 | 1050 | 1055 |
| Glu Ser Gln Val Arg Gln Leu Ala Trp Ile Gly Asp Gly Val Trp Val |      |      |      |
|   | 1060 | 1065 | 1070 |
| Ser Ile Arg Leu Asp Ser Thr Leu Arg Leu Tyr His Ala His Thr His |      |      |      |
|   | 1075 | 1080 | 1085 |

Gln His Leu Gln Asp Val Asp Ile Glu Pro Tyr Val Ser Lys Met Leu  
1090 1095 1100

Gly Thr Gly Lys Leu Gly Phe Ser Phe Val Arg Ile Thr Ala Leu Leu  
105 1110 1115 1120

Ile Ala Gly Asn Arg Leu Trp Val Gly Thr Gly Asn Gly Val Val Ile  
1125 1130 1135

Ser Ile Pro Leu Thr Glu Thr Val Val Leu His Arg Gly Gln Leu Leu  
1140 1145 1150

Gly Leu Arg Ala Asn Lys Thr Ser Pro Thr Ser Gly Glu Gly Thr Arg  
1155 1160 1165

Pro Gly Gly Ile Ile His Val Tyr Gly Asp Asp Ser Ser Asp Lys Ala  
1170 1175 1180

Ala Ser Ser Phe Ile Pro Tyr Cys Ser Met Ala Gln Ala Gln Leu Cys  
185 1190 1195 1200

Phe His Gly His Arg Asp Ala Val Lys Phe Phe Val Ser Val Pro Gly  
1205 1210 1215

Asn Val Leu Ala Thr Leu Asn Gly Ser Val Leu Asp Ser Pro Ser Glu  
1220 1225 1230

Gly Pro Gly Pro Ala Ala Pro Ala Ala Asp Ala Glu Gly Gln Lys Leu  
1235 1240 1245

Lys Asn Ala Leu Val Leu Ser Gly Gly Glu Gly Tyr Ile Asp Phe Arg  
1250 1255 1260

Ile Gly Asp Gly Glu Asp Asp Glu Thr Glu Glu Cys Ala Gly Asp Val  
265 1270 1275 1280

Asn Gln Thr Lys Pro Ser Leu Ser Lys Ala Glu Arg Ser His Ile Ile  
1285 1290 1295

Val Trp Gln Val Ser Tyr Thr Pro Glu  
1300 1305

<210> 10

<211> 1314

<212> PRT

<213> Mouse

<400> 10

Met Met Glu Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln  
1 5 10 15

Asp Asp Tyr Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu

20

25

30

Ala Gly Ser Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp

35

40

45

Glu Glu Val Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu

50

55

60

Asn Leu Asp Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu

65

70

75

80

Glu Leu Leu Arg Glu Asp Asn Glu Gln Leu Leu Thr Gln Tyr Glu Arg

85

90

95

Glu Lys Ala Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu

100

105

110

Asp Ala Leu Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His

115

120

125

Tyr Glu Phe Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala

130

135

140

Asp Gln Ile Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu

145

150

155

160

Tyr Asn Ala Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val

165

170

175

Glu His Ile Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln

180

185

190

Thr Glu Ser Ser Leu Pro Gly Arg Ser Pro Arg Gln Ser Trp Arg Lys

195

200

205

Ser Arg Lys Glu Arg Pro Thr Ser Leu Asn Val Phe Pro Leu Ala Asp

210

215

220

Gly Met Cys Pro Asn Asp Glu Met Ser Glu Ser Gly Gln Ser Ser Ala

225

230

235

240

Ala Ala Thr Pro Ser Thr Thr Gly Thr Lys Ser Asn Thr Pro Thr Ser

245

250

255

Ser Val Pro Ser Ala Ala Val Thr Pro Leu Asn Glu Ser Leu Gln Pro

260

265

270

Leu Gly Asp Tyr Val Ser Val Thr Lys Asn Asn Lys Gln Ala Arg Glu

275

280

285

Lys Arg Asn Ser Arg Asn Met Glu Val Gln Val Thr Gln Glu Met Arg

|   |     |     |     |
|---|-----|-----|-----|
| 290   | 295 | 300 |     |
| Asn Val Ser Ile Gly Met Gly Ser Ser Asp Glu Trp Ser Asp Val Gln |     |     |     |
| 305   | 310 | 315 | 320 |
| Asp Ile Ile Asp Ser Thr Pro Glu Leu Asp Val Cys Pro Glu Thr Arg |     |     |     |
|   | 325 | 330 | 335 |
| Leu Glu Arg Thr Gly Ser Ser Pro Thr Gln Gly Ile Val Asn Lys Ala |     |     |     |
|   | 340 | 345 | 350 |
| Phe Gly Ile Asn Thr Asp Ser Leu Tyr His Glu Leu Ser Thr Ala Gly |     |     |     |
|   | 355 | 360 | 365 |
| Ser Glu Val Ile Gly Asp Val Asp Glu Gly Ala Asp Leu Leu Gly Glu |     |     |     |
|   | 370 | 375 | 380 |
| Phe Ser Val Arg Asp Asp Phe Phe Gly Met Gly Lys Glu Val Gly Asn |     |     |     |
| 385   | 390 | 395 | 400 |
| Leu Leu Leu Glu Asn Ser Gln Leu Leu Glu Thr Lys Asn Ala Leu Asn |     |     |     |
|   | 405 | 410 | 415 |
| Val Val Lys Asn Asp Leu Ile Ala Lys Val Asp Gln Leu Ser Gly Glu |     |     |     |
|   | 420 | 425 | 430 |

Gln Glu Val Leu Lys Gly Glu Leu Glu Ala Ala Lys Gln Ala Lys Val

435

440

445

Lys Leu Glu Asn Arg Ile Lys Glu Leu Glu Glu Glu Leu Lys Arg Val

450

455

460

Lys Ser Glu Ala Val Thr Ala Arg Arg Glu Pro Arg Glu Glu Val Glu

465

470

475

480

Asp Val Ser Ser Tyr Leu Cys Thr Glu Leu Asp Lys Ile Pro Met Ala

485

490

495

Gln Arg Arg Arg Phe Thr Arg Val Glu Met Ala Arg Val Leu Met Glu

500

505

510

Arg Asn Gln Tyr Lys Glu Arg Leu Met Glu Leu Gln Glu Ala Val Arg

515

520

525

Trp Thr Glu Met Ile Arg Ala Ser Arg Glu His Pro Ser Val Gln Glu

530

535

540

Lys Lys Lys Ser Thr Ile Trp Gln Phe Phe Ser Arg Leu Phe Ser Ser

545

550

555

560

Ser Ser Ser Pro Pro Pro Ala Lys Arg Ser Tyr Pro Ser Val Asn Ile

565

570

575



His Tyr Lys Ser Pro Thr Ala Ala Gly Phe Ser Gln Arg Arg Ser His

580

585

590

Ala Leu Cys Gln Ile Ser Ala Gly Ser Arg Pro Leu Glu Phe Phe Pro

595

600

605

Asp Asp Asp Cys Thr Ser Ser Ala Arg Arg Glu Gln Lys Arg Glu Gln

610

615

620

Tyr Arg Gln Val Arg Glu His Val Arg Asn Asp Asp Gly Arg Leu Gln

625

630

635

640

Ala Cys Gly Trp Ser Leu Pro Ala Lys Tyr Lys Gln Leu Ser Pro Asn

645

650

655

Gly Gly Gln Glu Asp Thr Arg Met Lys Asn Val Pro Val Pro Val Tyr

660

665

670

Cys Arg Pro Leu Val Glu Lys Asp Pro Ser Thr Lys Leu Trp Cys Ala

675

680

685

Ala Gly Val Asn Leu Ser Gly Trp Lys Pro His Glu Glu Asp Ser Ser

690

695

700

Asn Gly Pro Lys Pro Val Pro Gly Arg Asp Pro Leu Thr Cys Asp Arg

705

710

715

720

Glu Gly Glu Gly Glu Pro Lys Ser Thr His Pro Ser Pro Glu Lys Lys

725

730

735

Lys Ala Lys Glu Thr Pro Glu Ala Asp Ala Thr Ser Ser Arg Val Trp

740

745

750

Ile Leu Thr Ser Thr Leu Thr Thr Ser Lys Val Val Ile Ile Asp Ala

755

760

765

Asn Gln Pro Gly Thr Ile Val Asp Gln Phe Thr Val Cys Asn Ala His

770

775

780

Val Leu Cys Ile Ser Ser Ile Pro Ala Ala Ser Asp Ser Asp Tyr Pro

785

790

795

800

Pro Gly Glu Met Phe Leu Asp Ser Asp Val Asn Pro Glu Asp Ser Gly

805

810

815

Ala Asp Gly Val Leu Ala Gly Ile Thr Leu Val Gly Cys Ala Thr Arg

820

825

830

Cys Asn Val Pro Arg Ser Asn Cys Ser Ser Arg Gly Asp Thr Pro Val

835

840

845

Leu Asp Lys Gly Gln Gly Asp Val Ala Thr Thr Ala Asn Gly Lys Val  
850 855 860

Asn Pro Ser Gln Ser Thr Glu Glu Ala Thr Glu Ala Thr Glu Val Pro  
865 870 875 880

Asp Pro Gly Pro Ser Glu Ser Glu Ala Thr Thr Val Arg Pro Gly Pro  
885 890 895

Leu Thr Glu His Val Phe Thr Asp Pro Ala Pro Thr Pro Ser Ser Ser  
900 905 910

Thr Gln Pro Ala Ser Glu Asn Gly Ser Glu Ser Asn Gly Thr Ile Val  
915 920 925

Gln Pro Gln Val Glu Pro Ser Gly Glu Leu Ser Thr Thr Thr Ser Ser  
930 935 940

Ala Ala Pro Thr Met Trp Leu Gly Ala Gln Asn Gly Trp Leu Tyr Val  
945 950 955 960

His Ser Ala Val Ala Asn Trp Lys Lys Cys Leu His Ser Ile Lys Leu  
965 970 975

Lys Asp Ser Val Leu Ser Leu Val His Val Lys Gly Arg Val Leu Val  
980 985 990

Ala Leu Ala Asp Gly Thr Leu Ala Ile Phe His Arg Gly Glu Asp Gly

995

1000

1005

Gln Trp Asp Leu Ser Asn Tyr His Leu Met Asp Leu Gly His Pro His

1010

1015

1020

His Ser Ile Arg Cys Met Ala Val Val Asn Asp Arg Val Trp Cys Gly

025

1030

1035

1040

Tyr Lys Asn Lys Val His Val Ile Gln Pro Lys Thr Met Gln Ile Glu

1045

1050

1055

Lys Ser Phe Asp Ala His Pro Arg Arg Glu Ser Gln Val Arg Gln Leu

1060

1065

1070

Ala Trp Ile Gly Asp Gly Val Trp Val Ser Ile Arg Leu Asp Ser Thr

1075

1080

1085

Leu Arg Leu Tyr His Ala His Thr His Gln His Leu Gln Asp Val Asp

1090

1095

1100

Ile Glu Pro Tyr Val Ser Lys Met Leu Gly Thr Gly Lys Leu Gly Phe

105

1110

1115

1120

Ser Phe Val Arg Ile Thr Ala Leu Leu Ile Ala Gly Asn Arg Leu Trp

1125

1130

1135

Val Gly Thr Gly Asn Gly Val Val Ile Ser Ile Pro Leu Thr Glu Thr

1140

1145

1150

Val Val Leu His Arg Gly Gln Leu Leu Gly Leu Arg Ala Asn Lys Thr

1155

1160

1165

Ser Pro Thr Ser Gly Glu Gly Thr Arg Pro Gly Gly Ile Ile His Val

1170

1175

1180

Tyr Gly Asp Asp Ser Ser Asp Lys Ala Ala Ser Ser Phe Ile Pro Tyr

185

1190

1195

1200

Cys Ser Met Ala Gln Ala Gln Leu Cys Phe His Gly His Arg Asp Ala

1205

1210

1215

Val Lys Phe Phe Val Ser Val Pro Gly Asn Val Leu Ala Thr Leu Asn

1220

1225

1230

Gly Ser Val Leu Asp Ser Pro Ser Glu Gly Pro Gly Pro Ala Ala Pro

1235

1240

1245

Ala Ala Asp Ala Glu Gly Gln Lys Leu Lys Asn Ala Leu Val Leu Ser

1250

1255

1260

Gly Gly Glu Gly Tyr Ile Asp Phe Arg Ile Gly Asp Gly Glu Asp Asp  
265 1270 1275 1280

Glu Thr Glu Glu Cys Ala Gly Asp Val Asn Gln Thr Lys Pro Ser Leu  
1285 1290 1295

Ser Lys Ala Glu Arg Ser His Ile Ile Val Trp Gln Val Ser Tyr Thr  
1300 1305 1310

Pro Glu

<210> 11

<211> 1337

<212> PRT

<213> Mouse

<400> 11

Met Met Glu Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln  
1 5 10 15

Asp Asp Tyr Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu  
20 25 30

Ala Gly Ser Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp

35

40

45

Glu Glu Val Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu

50

55

60

Asn Leu Asp Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu

65

70

75

80

Glu Leu Leu Arg Glu Asp Asn Glu Gln Leu Leu Thr Gln Tyr Glu Arg

85

90

95

Glu Lys Ala Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu

100

105

110

Asp Ala Leu Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His

115

120

125

Tyr Glu Phe Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala

130

135

140

Asp Gln Ile Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu

145

150

155

160

Tyr Asn Ala Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val

165

170

175

Glu His Ile Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln

180

185

190

Thr Glu Ser Ser Leu Pro Gly Arg Ser Arg Lys Glu Arg Pro Thr Ser

195

200

205

Leu Asn Val Phe Pro Leu Ala Asp Gly Met Val Arg Ala Gln Met Gly

210

215

220

Gly Lys Leu Val Pro Ala Gly Asp His Trp His Leu Ser Asp Leu Gly

225

230

235

240

Gln Leu Gln Ser Ser Ser Ser Tyr Gln Cys Pro Asn Asp Glu Met Ser

245

250

255

Glu Ser Gly Gln Ser Ser Ala Ala Ala Thr Pro Ser Thr Thr Gly Thr

260

265

270

Lys Ser Asn Thr Pro Thr Ser Ser Val Pro Ser Ala Ala Val Thr Pro

275

280

285

Leu Asn Glu Ser Leu Gln Pro Leu Gly Asp Tyr Val Ser Val Thr Lys

290

295

300

Asn Asn Lys Gln Ala Arg Glu Lys Arg Asn Ser Arg Asn Met Glu Val

305

310

315

320



Gln Val Thr Gln Glu Met Arg Asn Val Ser Ile Gly Met Gly Ser Ser

325

330

335

Asp Glu Trp Ser Asp Val Gln Asp Ile Ile Asp Ser Thr Pro Glu Leu

340

345

350

Asp Val Cys Pro Glu Thr Arg Leu Glu Arg Thr Gly Ser Ser Pro Thr

355

360

365

Gln Gly Ile Val Asn Lys Ala Phe Gly Ile Asn Thr Asp Ser Leu Tyr

370

375

380

His Glu Leu Ser Thr Ala Gly Ser Glu Val Ile Gly Asp Val Asp Glu

385

390

395

400

Gly Ala Asp Leu Leu Gly Glu Phe Ser Val Arg Asp Asp Phe Phe Gly

405

410

415

Met Gly Lys Glu Val Gly Asn Leu Leu Leu Glu Asn Ser Gln Leu Leu

420

425

430

Glu Thr Lys Asn Ala Leu Asn Val Val Lys Asn Asp Leu Ile Ala Lys

435

440

445

Val Asp Gln Leu Ser Gly Glu Gln Glu Val Leu Lys Gly Glu Leu Glu

|   |     |     |     |
|---|-----|-----|-----|
| 450   | 455 | 460 |     |
| Ala Ala Lys Gln Ala Lys Val Lys Leu Glu Asn Arg Ile Lys Glu Leu |     |     |     |
| 465   | 470 | 475 | 480 |
| Glu Glu Glu Leu Lys Arg Val Lys Ser Glu Ala Val Thr Ala Arg Arg |     |     |     |
|   | 485 | 490 | 495 |
| Glu Pro Arg Glu Glu Val Glu Asp Val Ser Ser Tyr Leu Cys Thr Glu |     |     |     |
|   | 500 | 505 | 510 |
| Leu Asp Lys Ile Pro Met Ala Gln Arg Arg Arg Phe Thr Arg Val Glu |     |     |     |
|   | 515 | 520 | 525 |
| Met Ala Arg Val Leu Met Glu Arg Asn Gln Tyr Lys Glu Arg Leu Met |     |     |     |
|   | 530 | 535 | 540 |
| Glu Leu Gln Glu Ala Val Arg Trp Thr Glu Met Ile Arg Ala Ser Arg |     |     |     |
| 545   | 550 | 555 | 560 |
| Glu His Pro Ser Val Gln Glu Lys Lys Lys Ser Thr Ile Trp Gln Phe |     |     |     |
|   | 565 | 570 | 575 |
| Phe Ser Arg Leu Phe Ser Ser Ser Ser Ser Pro Pro Pro Ala Lys Arg |     |     |     |
|   | 580 | 585 | 590 |

Ser Tyr Pro Ser Val Asn Ile His Tyr Lys Ser Pro Thr Ala Ala Gly  
595 600 605

Phe Ser Gln Arg Arg Ser His Ala Leu Cys Gln Ile Ser Ala Gly Ser  
610 615 620

Arg Pro Leu Glu Phe Phe Pro Asp Asp Asp Cys Thr Ser Ser Ala Arg  
625 630 635 640

Arg Glu Gln Lys Arg Glu Gln Tyr Arg Gln Val Arg Glu His Val Arg  
645 650 655

Asn Asp Asp Gly Arg Leu Gln Ala Cys Gly Trp Ser Leu Pro Ala Lys  
660 665 670

Tyr Lys Gln Leu Ser Pro Asn Gly Gly Gln Glu Asp Thr Arg Met Lys  
675 680 685

Asn Val Pro Val Pro Val Tyr Cys Arg Pro Leu Val Glu Lys Asp Pro  
690 695 700

Ser Thr Lys Leu Trp Cys Ala Ala Gly Val Asn Leu Ser Gly Trp Lys  
705 710 715 720

Pro His Glu Glu Asp Ser Ser Asn Gly Pro Lys Pro Val Pro Gly Arg  
725 730 735

Asp Pro Leu Thr Cys Asp Arg Glu Gly Glu Gly Glu Pro Lys Ser Thr

740

745

750

His Pro Ser Pro Glu Lys Lys Lys Ala Lys Glu Thr Pro Glu Ala Asp

755

760

765

Ala Thr Ser Ser Arg Val Trp Ile Leu Thr Ser Thr Leu Thr Thr Ser

770

775

780

Lys Val Val Ile Ile Asp Ala Asn Gln Pro Gly Thr Ile Val Asp Gln

785

790

795

800

Phe Thr Val Cys Asn Ala His Val Leu Cys Ile Ser Ser Ile Pro Ala

805

810

815

Ala Ser Asp Ser Asp Tyr Pro Pro Gly Glu Met Phe Leu Asp Ser Asp

820

825

830

Val Asn Pro Glu Asp Ser Gly Ala Asp Gly Val Leu Ala Gly Ile Thr

835

840

845

Leu Val Gly Cys Ala Thr Arg Cys Asn Val Pro Arg Ser Asn Cys Ser

850

855

860

Ser Arg Gly Asp Thr Pro Val Leu Asp Lys Gly Gln Gly Asp Val Ala

|   |      |      |     |
|---|------|------|-----|
| 865   | 870  | 875  | 880 |
| Thr Thr Ala Asn Gly Lys Val Asn Pro Ser Gln Ser Thr Glu Glu Ala |      |      |     |
| 885   | 890  | 895  |     |
| Thr Glu Ala Thr Glu Val Pro Asp Pro Gly Pro Ser Glu Ser Glu Ala |      |      |     |
| 900   | 905  | 910  |     |
| Thr Thr Val Arg Pro Gly Pro Leu Thr Glu His Val Phe Thr Asp Pro |      |      |     |
| 915   | 920  | 925  |     |
| Ala Pro Thr Pro Ser Ser Ser Thr Gln Pro Ala Ser Glu Asn Gly Ser |      |      |     |
| 930   | 935  | 940  |     |
| Glu Ser Asn Gly Thr Ile Val Gln Pro Gln Val Glu Pro Ser Gly Glu |      |      |     |
| 945   | 950  | 955  | 960 |
| Leu Ser Thr Thr Thr Ser Ser Ala Ala Pro Thr Met Trp Leu Gly Ala |      |      |     |
| 965   | 970  | 975  |     |
| Gln Asn Gly Trp Leu Tyr Val His Ser Ala Val Ala Asn Trp Lys Lys |      |      |     |
| 980   | 985  | 990  |     |
| Cys Leu His Ser Ile Lys Leu Lys Asp Ser Val Leu Ser Leu Val His |      |      |     |
| 995   | 1000 | 1005 |     |

Val Lys Gly Arg Val Leu Val Ala Leu Ala Asp Gly Thr Leu Ala Ile  
1010 1015 1020

Phe His Arg Gly Glu Asp Gly Gln Trp Asp Leu Ser Asn Tyr His Leu  
025 1030 1035 1040

Met Asp Leu Gly His Pro His His Ser Ile Arg Cys Met Ala Val Val  
1045 1050 1055

Asn Asp Arg Val Trp Cys Gly Tyr Lys Asn Lys Val His Val Ile Gln  
1060 1065 1070

Pro Lys Thr Met Gln Ile Glu Lys Ser Phe Asp Ala His Pro Arg Arg  
1075 1080 1085

Glu Ser Gln Val Arg Gln Leu Ala Trp Ile Gly Asp Gly Val Trp Val  
1090 1095 1100

Ser Ile Arg Leu Asp Ser Thr Leu Arg Leu Tyr His Ala His Thr His  
1105 1110 1115 1120

Gln His Leu Gln Asp Val Asp Ile Glu Pro Tyr Val Ser Lys Met Leu  
1125 1130 1135

Gly Thr Gly Lys Leu Gly Phe Ser Phe Val Arg Ile Thr Ala Leu Leu  
1140 1145 1150

Ile Ala Gly Asn Arg Leu Trp Val Gly Thr Gly Asn Gly Val Val Ile

1155

1160

1165

Ser Ile Pro Leu Thr Glu Thr Val Val Leu His Arg Gly Gln Leu Leu

1170

1175

1180

Gly Leu Arg Ala Asn Lys Thr Ser Pro Thr Ser Gly Glu Gly Thr Arg

1185

1190

1195

1200

Pro Gly Gly Ile Ile His Val Tyr Gly Asp Asp Ser Ser Asp Lys Ala

1205

1210

1215

Ala Ser Ser Phe Ile Pro Tyr Cys Ser Met Ala Gln Ala Gln Leu Cys

1220

1225

1230

Phe His Gly His Arg Asp Ala Val Lys Phe Phe Val Ser Val Pro Gly

1235

1240

1245

Asn Val Leu Ala Thr Leu Asn Gly Ser Val Leu Asp Ser Pro Ser Glu

1250

1255

1260

Gly Pro Gly Pro Ala Ala Pro Ala Ala Asp Ala Glu Gly Gln Lys Leu

1265

1270

1275

1280

Lys Asn Ala Leu Val Leu Ser Gly Gly Glu Gly Tyr Ile Asp Phe Arg

1285

1290

1295

Ile Gly Asp Gly Glu Asp Asp Glu Thr Glu Glu Cys Ala Gly Asp Val

1300

1305

1310

Asn Gln Thr Lys Pro Ser Leu Ser Lys Ala Glu Arg Ser His Ile Ile

1315

1320

1325

Val Trp Gln Val Ser Tyr Thr Pro Glu

1330

1335

<210> 12

<211> 1336

<212> PRT

<213> Mouse

<400> 12

Met Met Glu Ile Gln Met Asp Glu Gly Gly Gly Val Val Val Tyr Gln

1

5

10

15

Asp Asp Tyr Cys Ser Gly Ser Val Met Ser Glu Arg Val Ser Gly Leu

20

25

30

Ala Gly Ser Ile Tyr Arg Glu Phe Glu Arg Leu Ile His Cys Tyr Asp

35

40

45



Glu Glu Val Val Lys Glu Leu Met Pro Leu Val Val Asn Val Leu Glu

50

55

60

Asn Leu Asp Ser Val Leu Ser Glu Asn Gln Glu His Glu Val Glu Leu

65

70

75

80

Glu Leu Leu Arg Glu Asp Asn Glu Gln Leu Leu Thr Gln Tyr Glu Arg

85

90

95

Glu Lys Ala Leu Arg Lys Gln Ala Glu Glu Lys Phe Ile Glu Phe Glu

100

105

110

Asp Ala Leu Glu Gln Glu Lys Lys Glu Leu Gln Ile Gln Val Glu His

115

120

125

Tyr Glu Phe Gln Thr Arg Gln Leu Glu Leu Lys Ala Lys Asn Tyr Ala

130

135

140

Asp Gln Ile Ser Arg Leu Glu Glu Arg Glu Ser Glu Met Lys Lys Glu

145

150

155

160

Tyr Asn Ala Leu His Gln Arg His Thr Glu Met Ile Gln Thr Tyr Val

165

170

175

Glu His Ile Glu Arg Ser Lys Met Gln Gln Val Gly Gly Ser Gly Gln

|   |     |         |
|---|-----|---------|
| 180   | 185 | 190     |
| Thr Glu Ser Ser Leu Pro Gly Arg Arg Lys Glu Arg Pro Thr Ser Leu |     |         |
| 195   | 200 | 205     |
| Asn Val Phe Pro Leu Ala Asp Gly Met Val Arg Ala Gln Met Gly Gly |     |         |
| 210   | 215 | 220     |
| Lys Leu Val Pro Ala Gly Asp His Trp His Leu Ser Asp Leu Gly Gln |     |         |
| 225   | 230 | 235 240 |
| Leu Gln Ser Ser Ser Ser Tyr Gln Cys Pro Asn Asp Glu Met Ser Glu |     |         |
| 245   | 250 | 255     |
| Ser Gly Gln Ser Ser Ala Ala Ala Thr Pro Ser Thr Thr Gly Thr Lys |     |         |
| 260   | 265 | 270     |
| Ser Asn Thr Pro Thr Ser Ser Val Pro Ser Ala Ala Val Thr Pro Leu |     |         |
| 275   | 280 | 285     |
| Asn Glu Ser Leu Gln Pro Leu Gly Asp Tyr Val Ser Val Thr Lys Asn |     |         |
| 290   | 295 | 300     |
| Asn Lys Gln Ala Arg Glu Lys Arg Asn Ser Arg Asn Met Glu Val Gln |     |         |
| 305   | 310 | 315 320 |

Val Thr Gln Glu Met Arg Asn Val Ser Ile Gly Met Gly Ser Ser Asp  
325 330 335

Glu Trp Ser Asp Val Gln Asp Ile Ile Asp Ser Thr Pro Glu Leu Asp  
340 345 350

Val Cys Pro Glu Thr Arg Leu Glu Arg Thr Gly Ser Ser Pro Thr Gln  
355 360 365

Gly Ile Val Asn Lys Ala Phe Gly Ile Asn Thr Asp Ser Leu Tyr His  
370 375 380

Glu Leu Ser Thr Ala Gly Ser Glu Val Ile Gly Asp Val Asp Glu Gly  
385 390 395 400

Ala Asp Leu Leu Gly Glu Phe Ser Val Arg Asp Asp Phe Phe Gly Met  
405 410 415

Gly Lys Glu Val Gly Asn Leu Leu Leu Glu Asn Ser Gln Leu Leu Glu  
420 425 430

Thr Lys Asn Ala Leu Asn Val Val Lys Asn Asp Leu Ile Ala Lys Val  
435 440 445

Asp Gln Leu Ser Gly Glu Gln Glu Val Leu Lys Gly Glu Leu Glu Ala  
450 455 460

Ala Lys Gln Ala Lys Val Lys Leu Glu Asn Arg Ile Lys Glu Leu Glu  
465 470 475 480

Glu Glu Leu Lys Arg Val Lys Ser Glu Ala Val Thr Ala Arg Arg Glu  
485 490 495

Pro Arg Glu Glu Val Glu Asp Val Ser Ser Tyr Leu Cys Thr Glu Leu  
500 505 510

Asp Lys Ile Pro Met Ala Gln Arg Arg Arg Phe Thr Arg Val Glu Met  
515 520 525

Ala Arg Val Leu Met Glu Arg Asn Gln Tyr Lys Glu Arg Leu Met Glu  
530 535 540

Leu Gln Glu Ala Val Arg Trp Thr Glu Met Ile Arg Ala Ser Arg Glu  
545 550 555 560

His Pro Ser Val Gln Glu Lys Lys Lys Ser Thr Ile Trp Gln Phe Phe  
565 570 575

Ser Arg Leu Phe Ser Ser Ser Ser Ser Pro Pro Pro Ala Lys Arg Ser  
580 585 590

Tyr Pro Ser Val Asn Ile His Tyr Lys Ser Pro Thr Ala Ala Gly Phe

595

600

605

Ser Gln Arg Arg Ser His Ala Leu Cys Gln Ile Ser Ala Gly Ser Arg

610

615

620

Pro Leu Glu Phe Phe Pro Asp Asp Asp Cys Thr Ser Ser Ala Arg Arg

625

630

635

640

Glu Gln Lys Arg Glu Gln Tyr Arg Gln Val Arg Glu His Val Arg Asn

645

650

655

Asp Asp Gly Arg Leu Gln Ala Cys Gly Trp Ser Leu Pro Ala Lys Tyr

660

665

670

Lys Gln Leu Ser Pro Asn Gly Gly Gln Glu Asp Thr Arg Met Lys Asn

675

680

685

Val Pro Val Pro Val Tyr Cys Arg Pro Leu Val Glu Lys Asp Pro Ser

690

695

700

Thr Lys Leu Trp Cys Ala Ala Gly Val Asn Leu Ser Gly Trp Lys Pro

705

710

715

720

His Glu Glu Asp Ser Ser Asn Gly Pro Lys Pro Val Pro Gly Arg Asp

725

730

735

Pro Leu Thr Cys Asp Arg Glu Gly Glu Gly Glu Pro Lys Ser Thr His  
740 745 750

Pro Ser Pro Glu Lys Lys Lys Ala Lys Glu Thr Pro Glu Ala Asp Ala  
755 760 765

Thr Ser Ser Arg Val Trp Ile Leu Thr Ser Thr Leu Thr Thr Ser Lys  
770 775 780

Val Val Ile Ile Asp Ala Asn Gln Pro Gly Thr Ile Val Asp Gln Phe  
785 790 795 800

Thr Val Cys Asn Ala His Val Leu Cys Ile Ser Ser Ile Pro Ala Ala  
805 810 815

Ser Asp Ser Asp Tyr Pro Pro Gly Glu Met Phe Leu Asp Ser Asp Val  
820 825 830

Asn Pro Glu Asp Ser Gly Ala Asp Gly Val Leu Ala Gly Ile Thr Leu  
835 840 845

Val Gly Cys Ala Thr Arg Cys Asn Val Pro Arg Ser Asn Cys Ser Ser  
850 855 860

Arg Gly Asp Thr Pro Val Leu Asp Lys Gly Gln Gly Asp Val Ala Thr  
865 870 875 880

Thr Ala Asn Gly Lys Val Asn Pro Ser Gln Ser Thr Glu Glu Ala Thr

885

890

895

Glu Ala Thr Glu Val Pro Asp Pro Gly Pro Ser Glu Ser Glu Ala Thr

900

905

910

Thr Val Arg Pro Gly Pro Leu Thr Glu His Val Phe Thr Asp Pro Ala

915

920

925

Pro Thr Pro Ser Ser Ser Thr Gln Pro Ala Ser Glu Asn Gly Ser Glu

930

935

940

Ser Asn Gly Thr Ile Val Gln Pro Gln Val Glu Pro Ser Gly Glu Leu

945

950

955

960

Ser Thr Thr Thr Ser Ser Ala Ala Pro Thr Met Trp Leu Gly Ala Gln

965

970

975

Asn Gly Trp Leu Tyr Val His Ser Ala Val Ala Asn Trp Lys Lys Cys

980

985

990

Leu His Ser Ile Lys Leu Lys Asp Ser Val Leu Ser Leu Val His Val

995

1000

1005

Lys Gly Arg Val Leu Val Ala Leu Ala Asp Gly Thr Leu Ala Ile Phe

|   |      |      |      |
|---|------|------|------|
| 1010  | 1015 | 1020 |      |
| His Arg Gly Glu Asp Gly Gln Trp Asp Leu Ser Asn Tyr His Leu Met |      |      |      |
| 025   | 1030 | 1035 | 1040 |
| Asp Leu Gly His Pro His His Ser Ile Arg Cys Met Ala Val Val Asn |      |      |      |
|   | 1045 | 1050 | 1055 |
| Asp Arg Val Trp Cys Gly Tyr Lys Asn Lys Val His Val Ile Gln Pro |      |      |      |
|   | 1060 | 1065 | 1070 |
| Lys Thr Met Gln Ile Glu Lys Ser Phe Asp Ala His Pro Arg Arg Glu |      |      |      |
|   | 1075 | 1080 | 1085 |
| Ser Gln Val Arg Gln Leu Ala Trp Ile Gly Asp Gly Val Trp Val Ser |      |      |      |
|   | 1090 | 1095 | 1100 |
| Ile Arg Leu Asp Ser Thr Leu Arg Leu Tyr His Ala His Thr His Gln |      |      |      |
| 105   | 1110 | 1115 | 1120 |
| His Leu Gln Asp Val Asp Ile Glu Pro Tyr Val Ser Lys Met Leu Gly |      |      |      |
|   | 1125 | 1130 | 1135 |
| Thr Gly Lys Leu Gly Phe Ser Phe Val Arg Ile Thr Ala Leu Leu Ile |      |      |      |
|   | 1140 | 1145 | 1150 |



Ala Gly Asn Arg Leu Trp Val Gly Thr Gly Asn Gly Val Val Ile Ser  
1155 1160 1165

Ile Pro Leu Thr Glu Thr Val Val Leu His Arg Gly Gln Leu Leu Gly  
1170 1175 1180

Leu Arg Ala Asn Lys Thr Ser Pro Thr Ser Gly Glu Gly Thr Arg Pro  
185 1190 1195 1200

Gly Gly Ile Ile His Val Tyr Gly Asp Asp Ser Ser Asp Lys Ala Ala  
1205 1210 1215

Ser Ser Phe Ile Pro Tyr Cys Ser Met Ala Gln Ala Gln Leu Cys Phe  
1220 1225 1230

His Gly His Arg Asp Ala Val Lys Phe Phe Val Ser Val Pro Gly Asn  
1235 1240 1245

Val Leu Ala Thr Leu Asn Gly Ser Val Leu Asp Ser Pro Ser Glu Gly  
1250 1255 1260

Pro Gly Pro Ala Ala Pro Ala Ala Asp Ala Glu Gly Gln Lys Leu Lys  
265 1270 1275 1280

Asn Ala Leu Val Leu Ser Gly Gly Glu Gly Tyr Ile Asp Phe Arg Ile  
1285 1290 1295

Gly Asp Gly Glu Asp Asp Glu Thr Glu Glu Cys Ala Gly Asp Val Asn

1300

1305

1310

Gln Thr Lys Pro Ser Leu Ser Lys Ala Glu Arg Ser His Ile Ile Val

1315

1320

1325

Trp Gln Val Ser Tyr Thr Pro Glu

1330

1335

<210> 13

<211> 430

<212> PRT

<213> Mouse

<400> 13

Met Ser Gly Val Arg Pro Pro Ile Met Asn Gly Pro Met His Pro Arg

1

5

10

15

Pro Leu Val Ala Leu Leu Asp Gly Arg Asp Cys Thr Val Glu Met Pro

20

25

30

Ile Leu Lys Asp Val Ala Thr Val Ala Phe Cys Asp Ala Gln Ser Thr

35

40

45

Gln Glu Ile His Glu Lys Val Leu Asn Glu Ala Val Gly Ala Leu Met

50

55

60

Tyr His Thr Ile Thr Leu Thr Arg Glu Asp Leu Glu Lys Phe Lys Ala

65

70

75

80

Leu Arg Ile Ile Val Arg Ile Gly Ser Gly Phe Asp Asn Ile Asp Ile

85

90

95

Lys Ser Ala Gly Asp Leu Gly Ile Ala Val Cys Asn Val Pro Ala Ala

100

105

110

Ser Val Glu Glu Thr Ala Asp Ser Thr Leu Cys His Ile Leu Asn Leu

115

120

125

Tyr Arg Arg Thr Thr Trp Leu His Gln Ala Leu Arg Glu Gly Thr Arg

130

135

140

Val Gln Ser Val Glu Gln Ile Arg Glu Val Ala Ser Gly Ala Ala Arg

145

150

155

160

Ile Arg Gly Glu Thr Leu Gly Ile Ile Gly Leu Gly Arg Val Gly Gln

165

170

175

Ala Val Ala Leu Arg Ala Lys Ala Phe Gly Phe Asn Val Leu Phe Tyr

180

185

190

Asp Pro Tyr Leu Ser Asp Gly Ile Glu Arg Ala Leu Gly Leu Gln Arg

195

200

205

Val Ser Thr Leu Gln Asp Leu Leu Phe His Ser Asp Cys Val Thr Leu

210

215

220

His Cys Gly Leu Asn Glu His Asn His His Leu Ile Asn Asp Phe Thr

225

230

235

240

Val Lys Gln Met Arg Gln Gly Ala Phe Leu Val Asn Thr Ala Arg Gly

245

250

255

Gly Leu Val Asp Glu Lys Ala Val Ala Gln Ala Leu Lys Glu Gly Arg

260

265

270

Ile Arg Gly Ala Ala Leu Asp Val His Glu Ser Glu Pro Phe Ser Phe

275

280

285

Ser Gln Gly Pro Leu Lys Asp Ala Pro Asn Leu Ile Cys Thr Pro His

290

295

300

Ala Ala Trp Tyr Ser Glu Gln Ala Ser Ile Glu Met Arg Glu Glu Ala

305

310

315

320

Ala Arg Glu Ile Arg Arg Ala Ile Thr Gly Arg Ile Pro Asp Ser Leu

|   |     |     |         |
|---|-----|-----|---------|
|   | 325 | 330 | 335     |
| Lys Asn Cys Val Asn Lys Asp His Leu Thr Ala Ala Thr His Trp Ala |     |     |         |
|   | 340 | 345 | 350     |
| Ser Met Asp Pro Ala Val Val His Pro Glu Leu Asn Gly Ala Ala Tyr |     |     |         |
|   | 355 | 360 | 365     |
| Ser Arg Tyr Pro Pro Gly Val Val Ser Val Ala Pro Thr Gly Ile Pro |     |     |         |
|   | 370 | 375 | 380     |
| Ala Ala Val Glu Gly Ile Val Pro Ser Ala Met Ser Leu Ser His Gly |     |     |         |
|   | 385 | 390 | 395 400 |
| Leu Pro Pro Val Ala His Pro Pro His Ala Pro Ser Pro Gly Gln Thr |     |     |         |
|   | 405 | 410 | 415     |
| Val Lys Pro Glu Ala Asp Arg Asp His Thr Ser Asp Gln Leu         |     |     |         |
|   | 420 | 425 | 430     |

<210> 14

<211> 1508

<212> PRT

<213> Mouse

<400> 14

Met Met Ala Gly Glu Gly Ser Thr Ile Thr Ser Arg Ile Lys Asn Leu

1 5 10 15

Leu Arg Ser Pro Ser Ile Lys Leu Arg Arg Ser Lys Ala Gly Asn Arg

20 25 30

Arg Glu Asp Leu Ser Ser Lys Val Thr Leu Glu Lys Val Leu Gly Val

35 40 45

Thr Val Ser Gly Gly Arg Gly Leu Ala Cys Glu Pro Arg Ser Gly Leu

50 55 60

Val Ala Tyr Pro Ala Gly Cys Val Val Val Leu Phe Asn Pro Arg Lys

65 70 75 80

His Lys Gln His His Ile Leu Asn Ser Ser Arg Lys Thr Ile Thr Ala

85 90 95

Leu Ala Phe Ser Pro Asp Gly Lys Tyr Leu Val Thr Gly Glu Ser Gly

100 105 110

His Met Pro Ala Val Arg Val Trp Asp Val Ala Glu Arg Ser Gln Val

115 120 125

Ala Glu Leu Gln Glu His Lys Tyr Gly Val Ala Cys Val Ala Phe Ser

|   |     |     |     |
|---|-----|-----|-----|
| 130   | 135 | 140 |     |
| Pro Ser Ala Lys Tyr Ile Val Ser Val Gly Tyr Gln His Asp Met Ile |     |     |     |
| 145   | 150 | 155 | 160 |
| Val Asn Val Trp Ala Trp Lys Lys Asn Ile Val Val Ala Ser Asn Lys |     |     |     |
|   | 165 | 170 | 175 |
| Val Ser Ser Arg Val Thr Ala Val Ser Phe Ser Glu Asp Cys Ser Tyr |     |     |     |
|   | 180 | 185 | 190 |
| Phe Val Thr Ala Gly Asn Arg His Ile Lys Phe Trp Tyr Leu Asp Asp |     |     |     |
|   | 195 | 200 | 205 |
| Ser Lys Thr Ser Lys Val Asn Ala Thr Val Pro Leu Leu Gly Arg Ser |     |     |     |
|   | 210 | 215 | 220 |
| Gly Leu Leu Gly Glu Leu Arg Asn Asn Leu Phe Thr Asp Val Ala Cys |     |     |     |
|   | 225 | 230 | 235 |
| Gly Arg Gly Glu Lys Ala Asp Ser Thr Phe Cys Ile Thr Ser Ser Gly |     |     |     |
|   | 245 | 250 | 255 |
| Leu Leu Cys Glu Phe Ser Asp Arg Arg Leu Leu Asp Lys Trp Val Glu |     |     |     |
|   | 260 | 265 | 270 |

Leu Arg Asn Thr Asp Ser Phe Thr Thr Thr Val Ala His Cys Ile Ser  
275 280 285

Val Thr Gln Glu Tyr Ile Phe Cys Gly Cys Ala Asp Gly Thr Val Arg  
290 295 300

Leu Phe Asn Pro Ser Asn Leu His Phe Leu Ser Thr Leu Pro Arg Pro  
305 310 315 320

His Ala Leu Gly Thr Asp Ile Ala Ser Ile Thr Glu Ala Ser Arg Leu  
325 330 335

Phe Ser Gly Gly Val Asn Ala Arg Tyr Pro Asp Thr Ile Ala Leu Thr  
340 345 350

Phe Asp Pro Thr Asn Gln Trp Leu Ser Cys Val Tyr Asn Asp His Ser  
355 360 365

Ile Tyr Val Trp Asp Val Arg Asp Pro Lys Lys Val Gly Lys Val Tyr  
370 375 380

Ser Ala Leu Tyr His Ser Ser Cys Val Trp Ser Val Glu Val Tyr Pro  
385 390 395 400

Glu Ile Lys Asp Ser His Gln Ala Cys Leu Pro Leu Ser Ser Phe Ile  
405 410 415



Thr Cys Ser Ser Asp Asn Thr Ile Arg Leu Trp Asn Thr Glu Ser Ser

420

425

430

Gly Val His Gly Ser Thr Leu His Arg Asn Ile Leu Ser Asn Asp Leu

435

440

445

Ile Lys Ile Ile Tyr Val Asp Gly Asn Thr Gln Ala Leu Leu Asp Thr

450

455

460

Glu Leu Pro Gly Gly Asp Lys Ala Asp Gly Ser Leu Met Asp Pro Arg

465

470

475

480

Val Gly Ile Arg Ser Val Cys Ile Ser Pro Asn Gly Gln His Leu Ala

485

490

495

Ser Gly Asp Arg Met Gly Thr Leu Arg Ile His Glu Leu Gln Ser Leu

500

505

510

Ser Glu Met Leu Lys Val Glu Ala His Asp Ser Glu Ile Leu Cys Leu

515

520

525

Glu Tyr Ser Lys Pro Asp Thr Gly Leu Lys Leu Leu Ala Ser Ala Ser

530

535

540

Arg Asp Arg Leu Ile His Glu Leu Asp Ala Gly Arg Glu Tyr Ser Leu

|   |     |     |     |
|---|-----|-----|-----|
| 545   | 550 | 555 | 560 |
| Gln Gln Thr Leu Asp Glu His Ser Ser Ser Ile Thr Ala Val Lys Phe |     |     |     |
|   | 565 | 570 | 575 |
| Ala Ala Ser Asp Gly Gln Val Arg Met Ile Ser Cys Gly Ala Asp Lys |     |     |     |
|   | 580 | 585 | 590 |
| Ser Ile Tyr Phe Arg Thr Ala Gln Lys Ser Gly Glu Gly Val Gln Phe |     |     |     |
|   | 595 | 600 | 605 |
| Thr Arg Thr His His Val Val Arg Lys Thr Thr Leu Tyr Asp Met Asp |     |     |     |
|   | 610 | 615 | 620 |
| Val Glu Pro Ser Trp Lys Tyr Thr Ala Ile Gly Cys Gln Asp Arg Asn |     |     |     |
| 625   | 630 | 635 | 640 |
| Ile Arg Ile Phe Asn Ile Ser Ser Gly Lys Gln Lys Lys Leu Phe Lys |     |     |     |
|   | 645 | 650 | 655 |
| Gly Ser Gln Gly Glu Asp Gly Thr Leu Ile Lys Val Gln Thr Asp Pro |     |     |     |
|   | 660 | 665 | 670 |
| Ser Gly Ile Tyr Ile Ala Thr Ser Cys Ser Asp Lys Asn Leu Ser Ile |     |     |     |
|   | 675 | 680 | 685 |

Phe Asp Phe Ser Ser Gly Glu Cys Val Ala Thr Met Phe Gly His Ser  
690 695 700

Glu Ile Val Thr Gly Met Lys Phe Ser Asn Asp Cys Lys His Leu Ile  
705 710 715 720

Ser Val Ser Gly Asp Ser Cys Ile Phe Val Trp Arg Leu Ser Ser Glu  
725 730 735

Met Thr Ile Ser Met Arg Gln Arg Leu Arg Glu Arg Arg Gln Arg Gln  
740 745 750

Arg Gly Ile Lys Gln Gln Gly Pro Thr Ser Pro Gln Arg Ala Ser Gly  
755 760 765

Ala Lys Gln His His Ala Pro Val Val Pro Pro Ser Gly Pro Ala Leu  
770 775 780

Ser Ser Asp Ser Asp Lys Glu Gly Glu Asp Glu Gly Thr Glu Glu Glu  
785 790 795 800

Glu Leu Pro Ala Leu Pro Ile Leu Ser Lys Ser Thr Lys Lys Glu Leu  
805 810 815

Ala Ser Gly Ser Ser Pro Ala Leu Leu Arg Ser Leu Ser His Trp Glu  
820 825 830

Met Ser Arg Ala Gln Glu Thr Met Glu Tyr Leu Asp Pro Ala Pro Val

835

840

845

Ala Asn Thr Gly Pro Lys Arg Arg Gly Arg Trp Ala Gln Pro Gly Val

850

855

860

Glu Leu Ser Val Arg Ser Met Leu Asp Leu Arg Gln Ile Glu Thr Leu

865

870

875

880

Ala Pro Ser Pro Arg Gly Pro Ser Gln Asp Ser Leu Ala Val Ser Pro

885

890

895

Ala Gly Pro Gly Lys His Gly Pro Gln Ala Pro Glu Leu Ser Cys Val

900

905

910

Ser Gln Asn Glu Arg Ala Pro Arg Leu Gln Thr Ser Gln Pro Cys Ser

915

920

925

Cys Pro Asp Ile Ile Gln Leu Leu Ser Gln Glu Glu Gly Val Phe Ala

930

935

940

Gln Asp Leu Glu Pro Ala Pro Ile Glu Asp Gly Ile Val Tyr Pro Glu

945

950

955

960

Pro Ser Asp Ser Pro Thr Met Asp Thr Ser Ala Phe Gln Val Gln Ala

965

970

975

Pro Thr Gly Gly Ser Leu Gly Arg Met Tyr Pro Gly Ser Arg Gly Ser

980

985

990

Glu Lys His Ser Pro Asp Ser Ala Cys Ser Val Asp Tyr Ser Ser Ser

995

1000

1005

Arg Leu Ser Ser Pro Glu His Pro Asn Glu Asp Ser Glu Ser Thr Glu

1010

1015

1020

Pro Leu Ser Val Asp Gly Ile Ser Ser Asp Leu Glu Glu Pro Ala Glu

025

1030

1035

1040

Gly Asp Glu Asp Glu Glu Glu Glu Gly Gly Thr Gly Leu Cys Gly Leu

1045

1050

1055

Gln Glu Gly Gly Pro Arg Thr Pro Asp Gln Glu Gln Phe Leu Lys Gln

1060

1065

1070

Leu Phe Glu Thr Leu Ala Asn Gly Thr Ala Pro Gly Gly Pro Ala Arg

1075

1080

1085

Val Leu Glu Arg Thr Glu Ser Arg Ser Ile Ser Ser Arg Phe Leu Leu

1090

1095

1100

Gln Val Gln Thr Leu Pro Leu Arg Glu Pro Ser Leu Ser Ser Ser Gly  
105 1110 1115 1120

Leu Ala Leu Thr Ser Arg Pro Asp Gln Val Ser Gln Val Ser Gly Glu  
1125 1130 1135

Gln Leu Lys Gly Ser Gly Ala Thr Pro Pro Gly Ala Pro Pro Glu Met  
1140 1145 1150

Glu Pro Ser Ser Gly Asn Ser Gly Pro Lys Gln Val Ala Pro Val Leu  
1155 1160 1165

Leu Thr Arg Arg Arg Asn Asn Leu Asp Asn Ser Trp Ala Ser Lys Lys  
1170 1175 1180

Met Ala Ala Thr Arg Pro Leu Ala Gly Leu Gln Lys Ala Gln Ser Val  
185 1190 1195 1200

His Ser Leu Val Pro Gln Asp Glu Val Pro Ser Ser Arg Pro Leu Leu  
1205 1210 1215

Phe Arg Glu Ala Glu Thr Gln Gly Ser Leu Gly Ser Leu Pro Gln Ala  
1220 1225 1230

Gly Gly Cys Ser Ser Gln Pro His Ser Tyr Gln Asn His Thr Thr Ser  
1235 1240 1245

Ser Met Ala Lys Leu Ala Arg Ser Ile Ser Val Gly Glu Asn Pro Gly

1250

1255

1260

Leu Ala Thr Glu Pro Gln Ala Pro Ala Pro Ile Arg Ile Ser Pro Phe

265

1270

1275

1280

Asn Lys Leu Ala Leu Pro Ser Arg Ala His Leu Val Leu Asp Ile Pro

1285

1290

1295

Lys Pro Leu Pro Asp Arg Pro Thr Leu Thr Thr Phe Ser Pro Val Ser

1300

1305

1310

Lys Gly Leu Thr His Asn Glu Thr Glu Gln Ser Gly Pro Leu Arg Glu

1315

1320

1325

Pro Arg Lys Ala His Thr Thr Val Glu Lys His Ser Cys Leu Gly Glu

1330

1335

1340

Gly Thr Thr His Lys Ser Arg Thr Glu Cys Gln Ala Tyr Pro Gly Pro

345

1350

1355

1360

Asn His Pro Cys Arg Gln Gln Leu Pro Val Asn Asn Leu Leu Gln Ala

1365

1370

1375

Glu Ser Leu Gln Pro Leu Ser Pro Glu Lys Thr Arg Asn Pro Val Glu

1380

1385

1390

Ser Ser Arg Pro Gly Val Ala Leu Ser Gln Asp Ser Glu Leu Ala Leu

1395

1400

1405

Ser Leu Gln Gln Cys Glu Gln Leu Val Ala Glu Leu Gln Gly Asn Val

1410

1415

1420

Arg Gln Ala Val Glu Leu Tyr Arg Ala Val Thr Ser Cys Lys Thr Pro

425

1430

1435

1440

Ser Ala Glu Gln Ser His Ile Thr Arg Leu Leu Arg Asp Thr Phe Ser

1445

1450

1455

Pro Val Arg Gln Glu Leu Glu Val Leu Ala Gly Ala Val Leu Ser Ser

1460

1465

1470

Pro Gly Gly Ser Pro Gly Ala Val Ala Ala Glu Gln Thr Gln Ala Leu

1475

1480

1485

Leu Glu Gln Tyr Ser Glu Leu Leu Leu Arg Ala Val Glu Arg Arg Met

1490

1495

1500

Glu Arg Arg Leu

505



<210> 15

<211> 244

<212> PRT

<213> Mouse

<400> 15

Ser Ser Lys Tyr Ser Asn Glu Ser Arg Ser Gln Ala Asp Ser Gly Phe

1 5 10 15

Leu Gly Leu Arg Pro Thr Ser Val Asp Pro Ala Leu Arg Arg Arg Arg

20 25 30

Arg Gly Pro Arg Asn Lys Lys Arg Gly Trp Arg Arg Leu Ala Glu Glu

35 40 45

Pro Leu Gly Leu Glu Val Asp Gln Phe Leu Glu Asp Val Arg Leu Gln

50 55 60

Glu Arg Thr Thr Gly Gly Leu Leu Ala Glu Ala Pro Asn Glu Lys Leu

65 70 75 80

Phe Phe Val Asp Thr Gly Phe Lys Arg Lys Glu Pro Arg Lys Lys Arg

85 90 95

Thr Leu Val Gln Lys Lys Ser Gln Arg Leu Gln Lys Pro Leu Arg Val

|   |     |     |     |
|---|-----|-----|-----|
| 100   | 105 | 110 |     |
| Asp Leu Ala Leu Glu Asn His Ser Lys Ile Pro Ala Pro Lys Asp Ile |     |     |     |
| 115   | 120 | 125 |     |
| Leu Ala His Gln Val Pro Asn Ala Lys Lys Leu Arg Arg Lys Glu Glu |     |     |     |
| 130   | 135 | 140 |     |
| Leu Trp Glu Lys Leu Ala Lys Gln Gly Glu Leu Pro Arg Asp Val Arg |     |     |     |
| 145   | 150 | 155 | 160 |
| Lys Ala Gln Ala Arg Leu Leu Ser Pro Pro Thr Pro Lys Ala Lys Pro |     |     |     |
| 165   | 170 | 175 |     |
| Gly Pro Gln Asp Ile Ile Glu Arg Pro Phe Tyr Asp Leu Trp Asn Pro |     |     |     |
| 180   | 185 | 190 |     |
| Asp Asn Pro Leu Asp Thr Pro Leu Ile Gly Gln Asp Ala Phe Phe Leu |     |     |     |
| 195   | 200 | 205 |     |
| Glu Gln Thr Lys Lys Lys Gly Val Arg Arg Pro Gln Arg Leu His Ile |     |     |     |
| 210   | 215 | 220 |     |
| Lys Pro Ser Gln Val Pro Ala Val Glu Val Ile Pro Ala Gly Ala Ser |     |     |     |
| 225   | 230 | 235 | 240 |

Tyr Asn Pro Thr

<210> 16

<211> 484

<212> PRT

<213> Mouse

<400> 16

Met Ala Ala Gly Gly Asn Arg Asp Gly Glu Lys Arg Gly Ser Arg Ser  
1 5 10 15

Gln Ala Asp Ser Gly Phe Leu Gly Leu Arg Pro Thr Ser Val Asp Pro  
20 25 30

Ala Leu Arg Arg Arg Arg Arg Gly Pro Arg Asn Lys Lys Arg Gly Trp  
35 40 45

Arg Arg Leu Ala Glu Glu Pro Leu Gly Leu Glu Val Asp Gln Phe Leu  
50 55 60

Glu Asp Val Arg Leu Gln Glu Arg Thr Thr Gly Gly Leu Leu Ala Glu  
65 70 75 80

Ala Pro Asn Glu Lys Leu Phe Phe Val Asp Thr Gly Phe Lys Arg Lys  
85 90 95

Glu Pro Arg Lys Lys Arg Thr Leu Val Gln Lys Lys Ser Gln Arg Leu  
100 105 110

Gln Lys Pro Leu Arg Val Asp Leu Ala Leu Glu Asn His Ser Lys Ile  
115 120 125

Pro Ala Pro Lys Asp Ile Leu Ala His Gln Val Pro Asn Ala Lys Lys

|   |     |             |
|---|-----|-------------|
| 130   | 135 | 140         |
| Leu Arg Arg Lys Glu Glu Leu Trp Glu Lys Leu Ala Lys Gln Gly Glu |     |             |
| 145   | 150 | 155 160     |
| Leu Pro Arg Asp Val Arg Lys Ala Gln Ala Arg Leu Leu Ser Pro Pro |     |             |
|   | 165 | 170 175     |
| Thr Pro Lys Ala Lys Pro Gly Pro Gln Asp Ile Ile Glu Arg Pro Phe |     |             |
|   | 180 | 185 190     |
| Tyr Asp Leu Trp Asn Pro Asp Asn Pro Leu Asp Thr Pro Leu Ile Gly |     |             |
|   | 195 | 200 205     |
| Gln Asp Ala Phe Phe Leu Glu Gln Thr Lys Lys Lys Gly Val Arg Arg |     |             |
|   | 210 | 215 220     |
| Pro Gln Arg Leu His Ile Lys Pro Ser Gln Val Pro Ala Val Glu Val |     |             |
|   | 225 | 230 235 240 |
| Ile Pro Ala Gly Ala Ser Tyr Asn Pro Thr Phe Glu Asp His Gln Ala |     |             |
|   | 245 | 250 255     |
| Leu Leu Arg Glu Ala His Glu Val Glu Leu Gln Arg Glu Lys Glu Ala |     |             |
|   | 260 | 265 270     |
| Glu Lys Leu Glu Arg Gln Leu Ala Leu Pro Thr Ser Glu Gln Ala Ala |     |             |
|   | 275 | 280 285     |
| Thr Gln Glu Ser Val Phe Arg Glu Met Cys Glu Gly Leu Leu Glu Glu |     |             |
|   | 290 | 295 300     |
| Ser Asp Gly Glu Asp Glu His Glu Ala Gly Arg Ala Gly Gln Pro Glu |     |             |
|   | 305 | 310 315 320 |
| Ala Gly Asp Gly Thr Thr Glu Ile Ser Pro Thr Gly Ala Ala Gly Pro |     |             |
|   | 325 | 330 335     |
| Glu Lys Arg Met Glu Lys Lys Thr Glu Gln Gln Arg Arg Arg Glu Lys |     |             |

|   |     |         |
|---|-----|---------|
| 340   | 345 | 350     |
| Ala Ala Arg Lys Leu Arg Val Gln Gln Ala Ala Leu Arg Ala Ala Arg |     |         |
| 355   | 360 | 365     |
| Leu Gln His Gln Glu Leu Phe Arg Leu Arg Gly Ile Lys Ala Gln Val |     |         |
| 370   | 375 | 380     |
| Ala Arg Arg Leu Ala Glu Leu Ala Arg Arg Arg Glu Gln Arg Arg Ile |     |         |
| 385   | 390 | 395 400 |
| Arg Arg Leu Ala Glu Ala Asp Lys Pro Arg Arg Leu Gly Arg Leu Lys |     |         |
| 405   | 410 | 415     |
| Tyr Gln Ala Pro Asp Ile Asp Val Gln Leu Ser Ser Glu Leu Ser Gly |     |         |
| 420   | 425 | 430     |
| Ser Leu Arg Thr Leu Lys Pro Glu Gly His Ile Leu Arg Asp Arg Phe |     |         |
| 435   | 440 | 445     |
| Lys Ser Phe Gln Lys Arg Asn Met Ile Glu Pro Arg Glu Arg Ala Lys |     |         |
| 450   | 455 | 460     |
| Phe Lys Arg Lys Tyr Lys Val Lys Leu Val Glu Lys Arg Ala Tyr Arg |     |         |
| 465   | 470 | 475 480 |
| Glu Ile Gln Leu   |     |         |

<210> 17

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic DNA

<400> 17

tagatatcgc cttggaacaa gagaaga

27

<210> 18

<211> 31

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Synthetic DNA

<400> 18

atgaattctc agttgttctt tgtgacactg a

31